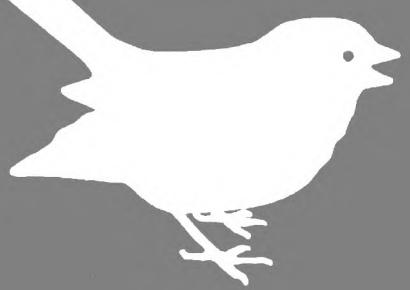


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London
Natural
History
Society

09 MAR 2016

THE LONDON NATURALIST

Journal of the
LONDON NATURAL HISTORY SOCIETY

No. 93

2014



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LONDON**SOCIETY**

The Society welcomes new members, both beginners and experts. Its recording area (the London Area) lies within a 20-mile (32-km) radius of St Paul's Cathedral and here most of its activities take place. Although much covered with bricks and mortar, it is an exciting region with an astonishing variety of flora and fauna. The Society is open to those interested in arachnology, archaeology, botany, conchology, conservation, ecology, entomology, geology, herpetology, mammalogy, ornithology, palaeontology, rambling, and all other aspects of natural history. The Society comprises various sections, but all meetings are open to members without formality.

Publications

The London Naturalist, published annually, contains papers on the natural history and archaeology of the London Area and beyond, including records of plants and animals.

The London Bird Report, also published annually, contains the bird records for the London Area for each year, as well as papers on various aspects of ornithology.

Bulletins of news items, including the Society's *Newsletter* are sent to members throughout the year.

Indoor meetings

These are held in most weeks throughout the year, with lectures, discussions, colour slides and films on all aspects of natural history.

Field meetings

Led by experts to visit interesting localities, both within and outside our Area. These excursions are very popular with beginners wishing to increase their knowledge, and enable members to get to know one another.

Library

A large selection of books and journals on most aspects of natural history is available for loan or consultation by members free of charge.

Reading circles

Many important natural history journals are circulated by the Sections at a fraction of the cost of subscribing direct.

SUBSCRIPTIONS

ORDINARY MEMBERS	£20.00
STUDENT MEMBERS	£5.00
SENIOR MEMBERS	£16.00
FAMILY MEMBERS.....	£4.00
CORPORATE SUBSCRIBERS	£20.00

Student membership is for persons under 18 or receiving full-time education, and senior membership is for persons over 65 who have been continuous members of the Society for ten complete years. All except family members receive one free copy of *The London Naturalist* and *London Bird Report* each year. Cheques and postal orders, payable to the London Natural History Society, should be addressed to

The Assistant Treasurer, LNHS,
Robin Blades,
32 Ashfield Road, London N14 7JY

THE LONDON NATURALIST

Further copies of this issue of *The London Naturalist* may be obtained (price £8 plus £2 postage and packing in the UK) from Catherine Schmitt, 4 Falkland Avenue, London N3 1QR. Back numbers of most recent issues of both *The London Naturalist* and *London Bird Report* are also available from the same address. Cheques should be made payable to the London Natural History Society.



Veteran oak by the Round Pond, Nonsuch Park, Ewell.



Jew's ear *Auricularia auricula-judae* growing on dead wood of sycamore at Nonsuch Park, Ewell.

See page 79.

The London Naturalist, No. 93, 2014

Photos: June E. Chatfield

THE
LONDON
NATURALIST

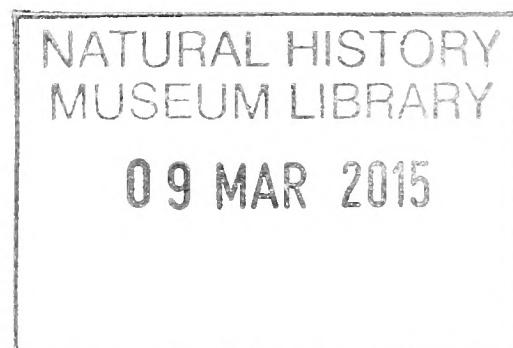
**Journal of the
LONDON NATURAL HISTORY SOCIETY**

**No. 93
for the year 2013**

Edited by K. H. Hyatt

Readers are respectfully advised that the publication of material in this journal does not imply that the views and opinions expressed herein are shared by the editor, the London Natural History Society, or any party other than the named authors.

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LONDON NATURAL HISTORY SOCIETY

Founded 1858

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HELEN BAKER, MBOU

60 Townfield, Rickmansworth, Hertfordshire WD3 7DD

Honorary Vice-Presidents

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J. F. Hewlett, PH.D., K. H. Hyatt, FLS, R. A. Softly.

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Llandovery, Carmarthenshire SA20 0NU.

Editor, *London Bird Report*: P. Lambert, 109 Gloucester Road, London E17 6AF.

Editor, *Newsletter*: M. Burgess, 92 Fellows Road, London NW3 3JG.

Elected Members of Council: D. Bevan, R. A. Blades, J. A. Edgington,
J. Hatton, K. H. Hyatt, M. Roberts, C. Schmitt, I. Woodward.

Representative Members of Council: BOOKHAM COMMON SURVEY —
S. Cole; BOTANY — R. J. Swindells; ECOLOGY AND ENTOMOLOGY —
S. Barnes; HAMPSTEAD HEATH SURVEY — Vacant; ORNITHOLOGY —
Vacant.

The Society's Recorders

Botany

Flowering plants and vascular cryptogams: Dr M. Spencer, 72 Michael Cliffe House, Skinner Street, London EC1R 0WX (020-7837 1471).

Fungi: Vacant.

Lichens: J. Skinner, 28 Parkanaur Avenue, Southend-on-Sea, Essex SS1 3HY.

Bryophytes: P. Howarth, 38a Regina Road, London N4 3PP (07920 143431).

Ecology and Entomology

Mammals: C. Herbert, 67a Ridgeway Avenue, East Barnet, Hertfordshire EN4 8TL (armconservation@hotmail.com).

Reptiles and amphibians: T. E. S. Langton, B.Sc., 12 Millfield Lane, London N6 6JD (t.langt@virgin.net).

Fishes: Vacant.

Arachnida: J. E. D. Milner, B.Sc., 80 Weston Park, London N8 9TB (acacia@dial.pipex.com).

Coleoptera (Carabidae and Coccinellidae): P. R. Mabbott, B.Sc., 49 Endowood Road, Sheffield S7 2LY (paulmabbott@blueyonder.co.uk).

Coleoptera (Lucanidae and Buprestidae): Dr D. S. Hackett, FRES, 3 Bryanstone Road, London N8 8TN (danielhackett@blueyonder.co.uk).

Coleoptera (families not otherwise listed): M. V. L. Barclay, 47 Tynemouth Street, London SW6 2QS (m.barclay@nhm.ac.uk).

Soil-dwelling invertebrates (Myriapoda, Isopoda, Diplura): Andy Keay, 37 Merrymeet, Woodmansterne, Surrey SM7 3HX (andykeay1@aol.com).

Lepidoptera (butterflies): L. R. Williams, 34 Christchurch Avenue, Kenton, Harrow, Middlesex HA3 8NJ (leslie.williams1597@btinternet.com).

Lepidoptera (moths), Syrphidae, and invertebrates not otherwise listed: C. W. Plant, B.Sc., FRES, 14 West Road, Bishop's Stortford, Hertfordshire CM23 3QP (cpauk1@ntlworld.com).

Orthoptera: Sarah Barnes, 33 Tavern Close, Carshalton, Surrey SM5 1JE (lnhs.orthoptera@virginmedia.com).

Hymenoptera Aculeata: R. W. J. Uffen, 4 Mardley Avenue, Welwyn, Hertfordshire AL6 0UD (01438 714968, ruffen@talktalk.net).

Hemiptera: T. Bantock, 101 Crouch Hill, London N8 9RD (tristanba@googlemail.com).

Odonata: Neil Anderson, B.Sc., 52 Beechwood Avenue, Greenford, Middlesex UB6 9UB (neil@anders42.freeserve.co.uk).

Plant galls: T. Root, 48 Coldhams Crescent, Huntingdon, Cambridgeshire PE9 1UG (trroot@hotmail.co.uk).

Mollusca: Vacant.

Records may be sent to the appropriate recorder (where shown) or to Colin Plant who will distribute to each recorder the relevant data from a mixed set of records.

Geology

Vacant

Ornithology

Chairman of Rarities Committee: R. J. Watts, 18 Nightingale Lane, London N8 7QU (bobwatts63@hotmail.com).

Buckinghamshire: A. V. Moon, 46 Highfield Way, Rickmansworth, Hertfordshire WD3 7PR (andrew.moon@talk21.com).

Essex: R. Woodward, 62c High Street, Cheshunt, Hertfordshire EN8 0AH (roy.rkwoodward@ntlworld.com).

Hertfordshire: Joan Thompson, 73 Raglan Gardens, Watford, Hertfordshire WD19 4LJ (lnhshertsrecorder@jksthompson.plus.com).

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Kent: J. Archer, 8 Smead Way, London SE13 7GE (john_archer@gofast.co.uk).

Middlesex: S. Huggins, 206 East Ferry Road, London E14 3AY (shuggins@hotmail.co.uk).

Surrey: N. Tanner, 11 Collins House, Newby Place, London E14 0AX (nick_tanner@talk21.com).

Records should be sent to the appropriate recorder.

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Editorial

When I offered to take over the editorship of *The London Naturalist* from Jack Laundon thirty-five years ago it just didn't occur to me that I might be doing it for the next three and a half decades! But it has been a great experience. As well as our then established authors, I have had close dealings with a new generation of active members.

During Jack's tenure funds were constrained as we were hoping we could secure our own permanent premises in central London, and thus, for a period in the 1960s and 1970s, *The London Naturalist* was a slim, saddle-stitched volume. However, it transpired that finding our own (or even shared) premises was out of the question, and gradually it has been possible to increase the size of the *LN*, whilst at the same time, I'm delighted to say, its reputation and status have grown. We now regularly attract authors from specialist societies and national scientific institutions whose work in London and the Home Counties has been a valuable complement to, and has enriched, our own members' long-term studies and surveys.

I must thank those of our members, and specialists in outside organizations, whose expert knowledge has been invaluable in refereeing original research papers, and also our members who have so readily agreed to my requests to review the many books received from publishers. Our own publications have been reviewed by non-members: I thank them also.

It has been a demanding task, but also a tremendously rewarding one, and I feel privileged to have been in the hot seat all this time. One thing I shall miss more than anything else is the interesting discussions with authors about their lines of research, which has often meant I have delved into literature they have cited, that otherwise I wouldn't have been aware of. I have learnt a lot, made new friends and rekindled earlier acquaintances.

I wish my successors as much pleasure as I have had, and I hope that *The London Naturalist* will flourish and maintain its status.

KEITH H. HYATT

Report of the Society for the year ending 30 June 2013

Approved at the Annual General Meeting on 4 December 2013

Objectives

The objectives of the Society are the study and recording of natural history, archaeology and other kindred subjects, especially within twenty miles of St Paul's Cathedral, the promotion of scientific investigations, the appreciation and conservation of the natural environment and the publication in the Society's journals of scientific and educational papers. Activities and achievements in respect of these objectives are described below.

Governance: Council, Committees and Sections

A Council of Trustees, comprising the officers (President, Treasurer, Secretary), up to ten representatives of the members at large and one representative of each of the Society's Sections (currently five) governs the Society. Sarah Barnes represented the Ecology and Entomology Section, David Darrell-Lambert the London Bird Club and John Swindells the Botany Section. Stuart Cole remained as representative for the Bookham Common Survey.

Shortly after the close of formal business at the 2012 AGM the President, Edward Tuddenham, announced his resignation from the role for personal reasons. Council was therefore obliged to fill this vacancy and was very pleased when Vice-President Jan Hewlett agreed to accept this role for the remainder of what would have been Ted's term of office.

Rule 4(c), limiting a continuous period of elected membership to five years, came into force in December 2005 and was first implemented at the AGM in 2010. This rule means that Sarah Graham-Brown will need to stand down at the end of the current year.

The Administration and Finance Committee, chaired by Michael Wilsdon, dealt with much delegated business.

Membership

Sixty-six new members joined during the year, compared with sixty-seven last year. The number of individual members currently stands at 924, compared with 948 at the same time last year, and 960 the previous year.

This continual decline is a disturbing trend and one that has been the subject of much discussion in council. Members who know people interested in natural history who are not LNHS members are encouraged to convince them to join us. The Society is not just for experts — field meetings are planned with beginners in mind, and newcomers are always encouraged to play an active part in the Society's affairs.

We record with regret the deaths of the following members during the year to 30 June (date of joining in brackets): Mr Howard Davies (1976), Mr Ernest Ormerod (1964), Mr Ken Palmer (1950), Mr Steve Pash (2011), Dr Paul Sokoloff (1993), Mr Chris Spencer (1985) and Dr Derek Yalden (1962).

Finances

The year to 30 June 2013 saw a slight decline in the value of the Society's reserves largely due to movements in financial markets and the consequent

impacts on our investments, although income derived from these investments continues to rise. Membership income has declined slightly (in part due to the decline in membership numbers). Further detail on the Society's finances in the year is contained in the Treasurer's Report and Financial Statements.

Activities

The Botany Section continued to focus on field work for the Flora of London Project aiming to produce a new flora of the London area to replace Rodney Burton's 1983 *Flora of the London Area*. During the relevant period the section organized a total of forty-three meetings (field, workshops and other indoor events). One highlight was a series of recording visits to Buckingham Palace Gardens (one a month) which started at the beginning of May 2013. These visits turned up some remarkable plants — the most outstanding record there in June 2013 was a record of a small colony of the striking orchid — white helleborine *Cephalanthera damasonium* — a new record for Middlesex.

The Flora remains a high profile and important Society project, and members are strongly encouraged to get out and 'bash a square' or two for this project.

The Ecology and Entomology Section continued to run its well-attended programme of field and indoor meetings covering a diverse group of taxa and developing a group of regular attendees as well as more occasional joiners. The section again represented the LNHS at the annual exhibitions of the Amateur Entomologists' Society and the British Entomological and Natural History Society.

Under the brand of the London Bird Club the Society has continued to run a series of field meetings showing the diversity of bird life that the LNHS area has to offer. Indoor meetings have continued to prove popular and covered a wider variety of birding topics.

Recording and recorders

Edward Tuddenham, our fungus recorder, stood down from his role this year. This vacancy, and several others amongst our recorders, remain to be filled. If anyone has the relevant expertise they are encouraged to come forward.

Thanks go to our recorders for all their continuing hard work.

Journals

The London Naturalist 91 (2012) was published in December 2012. Keith Hyatt, our long-serving editor of *The London Naturalist*, is standing down from this role after the 2014 edition, his thirty-fifth. Council is seeking a successor to continue the good work and maintain the high standards that Keith has established.

The *London Bird Report* for 2009 was published in September 2012 and for 2010 in June 2013. The editorial board has worked hard to get these reports out and we anticipate the 2011 report being out during the Society year ending June 2104.

Library

David Allen, the LNHS librarian, continues his good work operating and maintaining our library in its new home in the Angela Marmont Centre for

UK Biodiversity at the Natural History Museum's Darwin Centre Phase 2 making it available to the public (for reference) and LNHS members (for borrowing). The library is an important resource for members providing access to a wide range of out-of-print and hard-to-find natural history titles, and, unlike many other libraries, the Angela Marmont Centre is very welcoming of people bringing specimens to try to identify. Members are encouraged to make use of it.

Conservation of the natural environment

Rich habitats are still under threat from developers, though these threats are currently less likely in the depressed economic climate. The most high profile of these at the moment is the High Speed 2, despite some welcome decisions to move more of it under ground, which will run through the north-western part of our recording area. The Society is often asked to lend its voice to protests against such developments. Council's view is that an appropriate campaigning body in such cases is the London Wildlife Trust, the LNHS being better placed to provide evidence-based advice if required. Our partnership with GiGL helps ensure that our high-quality validated records are available for such purposes.

This report has been prepared with due regard to the Charity Commission's guidance on public benefit.

Treasurer's report for 2012/2013

As last year, the Society's accounts are presented on a receipts and payments basis, as permitted by the Charity Commission.

At the end of the financial year on 30 June 2013, the total net assets of the Society as detailed in the Statement of Assets and Liabilities had fallen to £348,607 compared with £357,175 the previous year, mainly due to a reduction in the value of the Society's investments.

The Receipts and Payments Accounts for the year show that receipts exceeded payments by £1,510 (2012: Payments exceeded receipts by £185) despite the production of two issues of the *London Bird Report* in the year.

Receipts from members and supporters amounted to £20,582 compared with £43,503 the previous year with the decrease mainly as a result of additional legacies received in the previous year, totalling £22,747. Total receipts in the year amounted to £37,439 (2012: £59,243).

Total expenditure was £35,867, compared with £59,428 in the previous year, with the decrease mainly related to the purchase of units in the COIF Charities Fixed Interest Fund at a cost of £25,000 in the previous year.

Reserves policy

The Society's unrestricted general funds can be regarded as expendable endowment since they are invested to provide a regular source of income as well as capital growth, over time.

Statement of trustees' responsibilities

Law applicable to charities in England and Wales requires the trustees to prepare financial statements for each financial year which give a true and fair

view of the charity's financial activities during the year and of its financial position at the end of the year. In preparing those financial statements the trustees are required:

- to select suitable accounting policies and then apply them consistently
- to make judgements and estimates that are reasonable and prudent
- to state whether applicable accounting standards and statements of recommended practice have been followed subject to any departures disclosed and explained in the financial statements
- to prepare the financial statements on the going concern basis unless it is inappropriate to presume that the charity will continue to operate.

The trustees are responsible for keeping accounting records which disclose with reasonable accuracy at any time the financial position of the charity and enable them to ensure that the financial statements comply with the Charities Act 2011. They are also responsible for safeguarding the assets of the charity and hence for taking reasonable steps for the prevention and detection of fraud or other irregularities.

Independent examiner's report to the trustees of the London Natural History Society

I report on the financial statements of the charity for the year ended 30 June 2013 as set out below.

This report is made solely to the charity's trustees, as a body, in accordance with section 145 Charities Act 2011. My work has been undertaken so that I might state to the charity's trustees those matters I am required to state to them in this report and for no other purpose. To the fullest extent permitted by law, we do not accept or assume responsibility to anyone other than the charity and the charity's members as a body, for this report, or for the opinions I have formed.

Respective responsibilities of trustees and examiner

The charity's trustees are responsible for the preparation of financial statements. The charity's trustees consider that an audit is not required for the year under section 144(2) of the Charities Act 2011 ('The 2011 Act') and that an independent examination is needed.

It is my responsibility:

- to examine the financial statements under section 145 of the 2011 Act
- to follow the procedures laid down in the General Directions given by the Charity Commissioners under section 145(5)(b) of the 2011 Act
- to state where particular matters have come to my attention.

Basis of independent examiner's report

My examination was carried out in accordance with the General Directions given by the Charity Commissioners. An examination includes a review of the accounting records kept by the charity and a comparison of the financial statements presented with those records. It also includes consideration of any unusual items or disclosures in the financial statements and seeks explanations from you as trustees concerning any such matters. The procedures undertaken do not provide all the evidence that would be required in an audit, and consequently no opinion is given as to whether the financial statements present a 'true and fair view', and the report is limited to those matters set out in the statement below.

Independent examiner's statement

In connection with my examination, no matter has come to my attention:

- (a) which gives me reasonable cause to believe that in any material respect the requirements:
- to keep accounting records in accordance with Section 130 of the 2011 Act
- to prepare financial statements which accord with the accounting records and to comply with the accounting requirements of the 2011 Act have not been met; or
- (b) to which, in my opinion, attention should be drawn in order to enable proper understanding of the financial statements to be reached.

J. L. Meyer, FCA

Meyer Williams (Chartered Accountants),
Stag House,
Old London Road,
Hertford, Herts SG13 7LA

11 November 2013

Statement of assets and liabilities as at 30 June 2013

	2013	2012
	£	£
Monetary assets		
Bank balances:		
National Westminster current account	346	—
National Westminster reserve account	10,300	8,873
Cash in hand	446	647
	<hr/> 11,092	<hr/> 9,520
Investment assets		
M&G Charibond	135,107	138,105
COIF Fixed Interest Fund	154,943	162,085
COIF Charities Deposit Fund	<u>47,465</u>	<u>47,465</u>
	<hr/> 337,515	<hr/> 347,655
Net assets	<u>£348,607</u>	<u>£357,175</u>

Approved on behalf of the trustees on 7 November 2013

Dr J. F. Hewlett – President

M. J. West – Treasurer

Receipts and payments account for the year ended 30 June 2013

Receipts	2013	2012
	£	£
Receipts from members and supporters:		
Subscriptions	16,193	16,276
Donations and other income	641	719
Legacies	290	22,747
Tax recovered on subscriptions and donations under Gift Aid	3,458	3,761
	<u>20,582</u>	<u>43,503</u>
Sales:		
Journals	808	527
<i>The Breeding Birds of the London Area</i>	—	57
Other publications	8	53
Merchandise	15	225
	<u>831</u>	<u>862</u>
Charities Fixed Interest Fund	8,716	7,539
Charities Deposit Fund interest	353	382
Income from M&G Charibond	6,937	6,937
Bank Deposit Account interest	6	8
Interest on Gift Aid tax recovered	<u>14</u>	<u>12</u>
	16,026	14,878
Total receipts	37,439	59,243
Less: total payments (below)	(35,439)	(59,243)
Net receipts / (payments) for the year	1,572	(185)
Cash at bank and in hand as at 1 July 2012	<u>9,520</u>	<u>9,705</u>
Cash at bank and in hand as at 30 June 2013	<u>11,092</u>	<u>9,520</u>

Payments

	2013	2012
	£	£
Meetings costs, sectional and general expenditure:		
Hire of halls and rooms	958	1,195
Lecturers' fees and expenses, sectional expenses etc.	876	731
Postage and telephone	202	308
Stationery	110	87
Services	257	239
Independent examiner's fees	1,560	1,560
Insurance	1,468	1,789
Honorarium and expense allowances	127	126
Bank charges (net of refunds)	<u>57</u>	<u>58</u>
	5,615	6,093
Publications:		
Printing and expenses:		
<i>The London Naturalist</i> No. 90	—	9,621
<i>The London Naturalist</i> No. 91	7,329	—
<i>London Bird Report</i> 2008	—	3,092
<i>London Bird Report</i> 2009	3,945	—
<i>London Bird Report</i> 2010	<u>4,336</u>	<u>—</u>
	15,610	12,713
<i>Programme</i>	615	615
<i>Bulletin and Newsletters</i>	4,083	4,081
Mailing	6,532	7,923
	<u>11,230</u>	<u>12,619</u>
Publications / journal sales expenditure	245	348
Library	1,285	1,839
Publicity	—	421
Asset and investment purchases:		
Purchase of library cupboards	1,882	—
Purchase of laptop	—	395
Purchase of COIF charities fixed interest fund units	—	25,000
Total payments for the year	<u>£35,867</u>	<u>£59,428</u>

Official and sectional reports for 2013

CONSERVATION

This is now my twentieth annual report on aspects of nature conservation in London. During this time there have been many changes to the city's natural environment and how Londoners (and politicians) perceive and value it. Further changes are now upon us and threats to London's green spaces have never been greater. In my report for last year I mentioned some of the worrying trends that were under way. In particular, I described the parlous state of the London Biodiversity Partnership (LBP) following its loss of funding from Natural England. With no such funding and very little support from the GLA, it came as no surprise that the Partnership was finally forced to close at the end of 2013. Its sad demise marks the end of a significant era for nature conservation in London. It is ironic that the Partnership closed so soon after the publication of the *State of Nature* report in June 2013. In this, a consortium of national environmental groups set out, all too graphically, the dramatic declines of a whole range of species and the degradation of many of their habitats (including urban ones) across the UK. It was to protect such vulnerable species and habitats across London that LBP was originally set up back in 1996 and the Partnership leaves behind a proud legacy of achievements. Before it closed, two of LBP's most active partners, the London Wildlife Trust (LWT) and Greenspace Information for Greater London (GiGL), were asked to prepare an audit of the current state of biodiversity conservation in London.

The resulting document, *All Change? The status of biodiversity conservation in London*, was published in December and provides a useful snapshot of the 'state of play' of conservation in the capital. There is only space to pick out a single topic here, but the full report is available from LWT for consultation. Wildlife sites are fundamentally important for biodiversity conservation and the report draws attention to the remarkable range of such places in London. There were more than 1,400 Sites of Importance for Nature Conservation (SINCs) recognized by the London boroughs at the time of the report. They covered more than 30,000 hectares and 19 per cent of London's total land area. No other city in the world can boast such coverage. The selection and grading of these sites was originally overseen by the London Ecology Unit, then promoted by the GLA, and finally incorporated into the Mayor's Biodiversity Strategy in 2002. In 2013 the GLA established a new body: the London Wildlife Sites Board, which continues to provide advice about site selection and boundary changes. However, there are concerns that there is now no coordinating body to comment on planning applications affecting these sites or to record and promote any positive management within them. The boroughs are ultimately responsible for managing and protecting most SINCs, but with recent significant reductions to their funding and a proposed further 10 per cent cut in 2015/16, they are under increasing pressure. Land management therefore, is likely to become increasingly dependent on Friends groups and others in an already stretched voluntary sector. There are many concerns too about the future of the overarching London Biodiversity Action Plan, the crowning achievement of LBP. The data that underpin it are now in the safe hands of GiGL, but the future of the Plan itself remains uncertain.

On a more personal note, I was very sorry to learn of the death of Jacqueline Shane (Obituary, *LN* 92, 2013). Jacqueline was an active member of the

Nature Conservation Working Group during its heyday at the end of the 1990s. In the summer of 1997 she led three meetings for us, culminating with a visit in May to a meadow at Longford near Heathrow Airport. It was here, during the previous year, that Jacqueline had found a population of water avens *Geum rivale*. As Jan Hewlett remarked in her obituary, this was indeed a 'star discovery' of a plant thought to be extinct in Middlesex and all but lost from southeast England. Duggie Kent (in lit.) had no doubt that the population was indeed the same one known to the botanist John Lightfoot c. 1780. Unfortunately the meadow in question had recently been chosen by BAA (owner of the Airport) as being 'the most suitable' one on which to construct a spur road linking the proposed new Terminal 5 to the adjacent M25 motorway. Jacqueline organized a number of visits to the meadow and, with the help of other members of the Nature Conservation Working Group, and the London Wildlife Trust, the Society was able to present a detailed Proof of Evidence to the Public Inquiry. Although we were ultimately unsuccessful in saving the meadow, BAA was persuaded to undertake a translocation exercise, moving key components of the meadow flora to a nearby site that they owned called Meadow Farm. Jacqueline and other members of the working group visited the site in 2010, when they had the pleasure of seeing that the water avens was well established. Without Jacqueline's eagle-eyed discovery, water avens is most unlikely to have survived. Instead, it appears to be flourishing in its new home and provides a fitting memorial to her.

I am grateful to Mathew Frith, Director of Policy and Planning at LWT, for drawing my attention to details of the *All Change?* report.

DAVID BEVAN, *Conservation Officer*

BOTANY

At our AGM on 13 November 2013, Trevor James addressed us on: 'Once in a lifetime: producing the Flora of Hertfordshire'. Trevor began his talk by quoting the late John Dony, who wrote an earlier flora of Hertfordshire (1967), as saying: 'Most botanists only produce one flora in their lifetime.' Trevor said that he now understood the reasons why!

Historical background

Trevor outlined the historical context of the new flora, starting with William Turner's early mention of the 'spindle tree' in his *Names of Herbes* (1548) 'between Ware and Barkway' — where it can still be found today. Trevor touched briefly on the contributions of several seventeenth and eighteenth century botanists, before expanding on the work of W. H. Coleman (1816–63) and R. H. Webb (1805–80) who produced the first flora of the county, *Flora Hertfordiensis* (1848–49). This was a remarkable flora in many respects. Coleman had prepared a geographical introduction and in this he divided the county into three river-drainage systems (Lee, Colne and Ouse), which were then further divided into several approximately equal areas. This gave a useful structure to the flora and most authors of future local floras followed suit. The completed flora covered 933 species and forty-seven individuals contributed records. Unfortunately, most of Coleman's herbarium specimens were destroyed by the North Hertfordshire Museum who thought they were infested and had them burned. A few, from elsewhere, do survive however, including

specimens of river water-dropwort *Oenanthe fluviatilis* from the River Ash. These are of special significance as it was Coleman who first realized that *O. fluviatilis* was deserving of specific rank.

A second flora appeared in 1887, being the work of A. R. Pryor (1839–81). This proved to be a rather disappointing work when compared with its predecessor. Prior was an excellent botanist who sadly died very young. The flora, published six years after his death, was assembled from Pryor's records by B. Daydon Jackson (1846–1927), then botanical secretary of The Linnean Society. Unfortunately, Daydon Jackson was a bibliophile rather than a botanist, and the resulting flora was a rather turgid affair. Finally, eighty years later, John Dony published the third flora of Herts. in 1967. This well-known flora was the first to use dot maps and the first to include 'habitat studies' — both significant innovations often used by later flora writers. Trevor made extensive use of these dot maps to demonstrate, in his own flora, later changes in plant distribution. Unfortunately, he wasn't able to revisit Dony's habitat studies and these could provide a useful basis for future work on habitat change.

The new flora

Fieldwork for the new flora started in 1987 (though some records date back to 1981) and continued until 2005 (with a few significant records up to 2009). The flora is tetrad-based and 491 of the 508 Herts. tetrads (or part tetrads) were surveyed. A total of 157,000 records were compiled and computerized. Trevor disliked Mapmate software and, after starting with a card-based system, he then moved on to Recorder 3, and now uses Recorder 6 as the standard database for the flora. More than 300 individuals contributed records. Throughout the project, Trevor emphasised the importance of accurate site recording, so that different habitats within the same tetrad should be recorded separately. Evenness of coverage was very important.

At the start of recording, Trevor was Keeper of Natural History at North Hertfordshire Museum, which possessed a herbarium — the only one in Herts. Trevor was made redundant in 1990 and moved to the Herts. Biological Records Centre in Hitchin. The centre was subsequently moved to County Hall where it was considered of little importance, so that from 1998–2009 the 5,000 plant specimens were kept in Trevor's home.

Some unexpected discoveries

Marsh violet *Viola palustris*: new to the county; a few non-flowering plants on Patmore Heath.

Soft shield-fern *Polystichum setiferum*: a huge increase of records — forty-seven tetrads (Dony had only three). Why? Climate change? Garden escapes? There has been a similar increase in the London Area.

Spiked star-of-Bethlehem *Ornithogalum pyrenaicum*: new to the county, in an old orchard at Dunsley, near Tring.

Purple small-reed *Calamagrostis canescens*: thought to be extinct in the county, until refound at Watery Grove, Knebworth in 2008.

Mezereon *Daphne mezereum*: three small bushes were found in 1990 at the edge of Hoo Wood, Great Gaddesden, close to an enigmatic record by A. R. Pryor in 1875 'near Gaddesden' — raising the remote possibility that it could be native.

Mousetail *Myosurus minimus*: apparently very rare (6 tetrads), but possibly overlooked. It was found at North Mymms in 1986 from where it had previously been seen c.1800, but seemingly not since.

‘Stingless nettle’ *Urtica dioica* ssp. *galeopsifolia*: found in several old wet woodlands across the county.

Meadow clary *Salvia pratensis*: another enigmatic plant regarding the possibility of it being native at one of its very few sites. It was discovered in 1988 near an old chalk pit near Hertford, close to where it had been recorded in 1909.

Hybrid woolly thistle *Cirsium × sennenii* (*C. eriophorum* × *C. arvense*). The first British record of this rare hybrid was found by Pat Watt at Danesbury Park in 2007.

The following rare Herts. plants were not refound during the survey: moon carrot *Seseli libanotis*, last seen in 1976; bog pimpernel *Anagallis tenella*, last seen in 1965; ground pine *Ajuga chamaepitys*, last seen in 1964; heath cudweed *Gnaphalium sylvaticum*, last seen in 1979.

By contrast, there has been a significant increase in certain plants with ‘invasive’ habits: butterfly bush *Buddleja davidii* heads the list with an enormous increase (3,291 per cent) since Dony’s flora, though he may have under-recorded it (his ms. index gives just five records); green alkanet *Pentaglottis sempervirens* showed a 3,118 per cent increase over the same period and prickly lettuce *Lactuca serriola* increased by 277 per cent.

Trevor concluded his talk by remarking that any published flora is always incomplete — and out of date by the time it comes out. In the case of the Herts. flora, the small tufted sedge *Carex cespitosa*, was added to the British flora in 2011 when it was confirmed from a site at Braughing, to the west of Bishop’s Stortford.

Following a lively question and answer session, Trevor was warmly thanked for his excellent and instructive talk, which contained much useful advice for the London Flora Project.

Indoor meetings

We began 2013 with our old favourites: Best Botanical Photographs and the popular Botany Quiz in January. In the spring, Mark Spencer ran a series of botany workshops for beginners, and in the summer and autumn he organized and led workshops on difficult groups — *Cotoneaster* and *Crataegus*; *Aster*, *Solidago* and *Conyza*; Lemnaceae (led by Fred Rumsey), and Conifers (with George Hounsome). All these workshops aimed to improve the ID skills of those recording for the London Flora Project.

Field meetings

The field meetings programme was organized with great efficiency as always by George Hounsome. In total, there were thirty-eight meetings with an average attendance of about nine people, though some attracted as many as twenty participants. Our first outing of the year was a bryophyte meeting in early February to Wimbledon Common led by our Recorder Pete Howarth. The London Flora Project featured very prominently in the programme. The monad recording meetings began early — with a February visit to Wandsworth Common

— and continued through the spring, covering monads in Leyton, St Johns, Clapton to Lea Bridge, Beckenham, Wimbledon Common, Stratford/Bow, Sidcup and Lewisham. In the summer there were visits to monads in meadows near the Colne, Waterloo, Walworth, Thurrock, New Eltham, the Thames footpath from Crayford to Erith, Stockwell, Scratch Wood, Yardley Hill and Hawk Wood, and in late August, we recorded plants growing in the River Wandle.

With the kind assistance of Professor Mick Crawley, we were able to organize a series of recording visits (once a month through the summer) to the gardens of Buckingham Palace. Our records will make a useful contribution to the Flora of London Project. The discovery of a colony of white helleborine *Cephalanthera damasonium*, new to Middlesex, was an unexpected highlight on 17 June.

There were excursions to an old favourite: London Zoo, and to Hounslow Heath, Ruislip Woods, Brockwell Park Community Garden and Banstead Downs. There was also the ever-popular Pot Luck in the East End, led by John Swindells, Tom Cope's survey of the wild plants at Kew and Tim Pyner's visit to Paglesham for salt-marsh flora.

In the early autumn there was further recording for the London Flora Project at Maze Hill, Richmond Park and Sydenham, together with a visit to Holland Park for conifers, and (in its twenty-second consecutive year) the ever-popular Haringey Fungus Foray, led for us again by Ted Tuddenham at the end of October.

Recorders' reports

Bryophytes

Most of the recording this year has focussed on the part of the LNHS area that lies in Surrey. There has been a continuation of the spread of previously rare species. These have included the epiphytes, mosses *Orthotrichum stramineum*, *Ulota phyllantha* and *Syntrichia papillosa* and liverwort *Cololejeunea minutissima*. The reasons for their spread are unclear but may be a result of the continued improvement of air quality.

The series of field trips has continued with a visit to Wimbledon Common. The main aim of the excursion was to find the rare liverwort *Pallavicinia lyellii* (which was successful), along with examining a number of other more common species.

Another interesting visit was to record the mosses and liverworts of the grounds of Buckingham Palace, a great opportunity to see a special site. Notable species included *Orthotrichum cupulatum*, only the second record of this moss in the vice-county (Middlesex).

DAVID BEVAN, *Chairman*, SARAH GRAHAM-BROWN, *Secretary*

ECOLOGY AND ENTOMOLOGY

The section again ran a full and varied selection of field meetings, indoor talks and workshops, as well as taking an extensive part in the Society's long-running survey of Bookham Common. Thanks are particularly due to Tristan Bantock, Claudia Watts and Stuart Cole for their organizational roles in these activities. Meetings are listed in the Society's biannual *Programme* and many are summarized for our quarterly *Newsletter*.

Many thanks also to all members of the Section's committee and its long list of recorders for the time and skills which they offer freely to the Section and the Society as a whole. We are indebted to the leaders of and speakers at our

meetings for sharing their skills and knowledge, and know that many members have taken enjoyment and a sense of fulfilment from them.

The Brad Ashby Memorial Lecture is an annual event organized by the British Entomological & Natural History Society and the LNHS. It is the Section's responsibility to organize it in odd-numbered years on behalf of our Society and we thank Claudia Watts again for her role here. This year saw Jane Memmott, Professor of Ecology at University of Bristol, talk on her work with urban pollinators, a part of the European Pollinator Initiative.

MICK MASSIE, *Chairman*, KEIR MOTTRAM, *Secretary*

LONDON BIRD CLUB

The London Bird Club has now established itself. Field trips to identify birds at hotspots around London were arranged nearly every weekend and there were many interesting birds seen on our coach outings. Everyone involved in the *London Bird Report* again made a magnificent effort and in 2013 we published *LBR* 2010 and 2011. The field work for the London Atlas was completed and the maps were being prepared. We sponsored the publication of a book, *The birds of London*, written by the LNHS Bird Recorder for London, Andrew Self. It is a complete reference book of birds of the London Area.

Officers' reports for 2013

Neil Anderson reports on the coach trips. 'In May we had our first trip to Nags Head for a few years. Sadly rather wet but wild boar, wood warbler, pied flycatcher, raven and tree pipit were seen. In June we went to Strumpshaw Fen. Again, the weather let us down — it was dry but overcast and cool. Marsh harriers put on a good show. There were no butterflies or dragonflies but plenty of insects in the herbage and many of the flowers were late due to the miserable spring. All trips were fairly well attended. For the winter programme, Rutland Water had a low attendance and the trip was beset with a coach breakdown, which left us waiting over two hours for a replacement but we saw plenty of good birds in sunshine when we finally arrived. The Minsmere trip was almost fully booked, though a few cancellations due to illness reduced numbers slightly. This was an excellent day with highlights including tundra bean geese, male hen harrier and otter.'

Pete Lambert reports on the field trips which are made each weekend round London: 'In 2013 I organized thirty-six walks. Six of these were to the following sites which we had not visited recently: Greenwich Peninsula and Ecology Park, Hampstead Heath, Bookham Common, Dagenham Chase, Canons Farm and Wanstead Park/Flats. The other sites we visited were Cheshunt Gravel Pits, Tooting Common, Bedfont Lakes, East India Dock, Greenwich Park, Brent Reservoir, Hyde Park/Kensington Gardens, Alexandra Park, Fairlop Waters, Wandsworth Common, Crossness, Totteridge, Sewardstone, Wormwood Scrubs, Amwell NR, Beddington Farmlands, Rainham Marshes, Rye Meads, Richmond Park and Two Tree Island. We also had two walks on identification: on ageing immature gulls at the South Bank and on identifying female ducks at Walthamstow Reservoir. I would like to thank all the leaders of these walks for giving up their time to do this. I am always on the lookout for new places for walks, and new leaders to take people round. Please let me know if you have any suggestions for either.'

Kat Duke reports on the indoor meetings: 'The key news for indoor meetings this year was the doubling of our venue's hire price which has necessitated the introduction of a £2 door charge for most talks from September 2013 onwards (sponsored talks and the AGM and its accompanying talk being the exceptions). The LookOut, or Isis Education Centre, in Hyde Park, run by the Royal Parks Foundation charity, had been giving us a hugely discounted rate of just £50 per night (it is usually around £600 for an evening's hire), but they had not really thought that rate through and decided they need to charge £100 plus VAT from September 2013 onwards. So, the new door charge was brought in to cover the price rise. Council and committee members, under 18s and those in full-time education are exempt from the charge, though many seem to willingly pay it anyway, which is gratifying, and I am happy to report that everyone attending the talks has been very gracious about paying.'

'This highly-equipped venue in a natural setting continues to be popular so it is worth hanging on to and it is still at a competitive price, and those attending are accustomed to finding it now (though I have started meeting newcomers in a nearby café at Marble Arch to guide them to the venue when requested, to ensure numbers are maximized). Looking forward, at least one talk a year may now be a sponsored event to help with costs, starting with a talk on Scottish wildlife, courtesy of the Speyside Wildlife holiday company, hence the reason their brochures were available at talks during 2013. Sponsors cover the venue hire fee and provide or pay for the speaker so their talks are free to members, but they must be informative and enjoyable wildlife talks befitting our aims. For one talk a year, this seems a prudent move for the charity.'

'In January 2013 Jodie Randall's Wildlife of the South East talk on wildlife photography attracted twenty-six people, including three non-LNHS members and a film-crew! February's talk from Martin Garner on The Wonder of Birds – Rarities and Surprises in London and Beyond, was highly vivacious and attracted forty-four people, including no less than ten non-members, which is excellent news for the growth of the charity. March's talk from Dr Richard Bullock on the London Wetland Centre was the first of a series called London's Finest Birdwatching Sites, which will be held every March as the talks programme comes to a close and people prepare to go out birdwatching in the spring and summer. It attracted a fabulous forty-seven people, including around nine non-members, one drawn in from an article in *The Daily Telegraph*, three from the Royal Parks Foundation website/Twitter feed, and five from other websites. In September the new season kicked off with no less than Professor Ian Newton, whom we have long wanted to book. Sadly though, his talk on Highlights from a Long-term Study of Sparrowhawks attracted just thirty-three people, six of which were non-members (a good turn-out but much lower than I hoped for such a notable speaker), and October's talk from the BTO's Chris Dee on Big Changes in Hertfordshire's Birds – Analysis of Results from the Atlas, which attracted just thirteen people. Traditionally, the final talk of the year comes from our chairman, David Darrell-Lambert, straight after the London Bird Club AGM and this year's very educational ID talk had thirty-two of us Wading Through Waders. Overall, LBC talk attendance numbers are healthy and the high attendances we enjoyed last year look set to continue.'

'Sustained efforts to publicize the talks widely include use of The Lecture List website, which lists public talks taking place in the UK (other sections are welcome to contact me for log-in details to advertise their talks too), the

BirdGuides website events page, the Royal Parks Foundation website and our (and the RPF's) Twitter feeds. All these efforts collectively broaden our audience and spread the LNHS's reach.'

Pete Lambert reports on the *London Bird Report* that 'During 2013 we managed to publish two issues of the *London Bird Report*, *LBR* 2010 in June 2013 and *LBR* 2011 in December 2013. This means that in the three years since the Editorial Board was set up in September 2010, we have managed to publish five editions of the *LBR*. We hope now to publish one edition each year, having reduced the backlog we inherited. I'd like to thank all the many people who have helped with the production process, without whom this would not have been possible. If anyone else would like to help with future editions, please let me know.'

Andrew Self reported on the work of the Records Committee. 'There were again no changes to the recording team this year and that has helped in the production of the database. We are still having some issues with sites that do not complete a spreadsheet of their records. The recorders completed the 2012 database by December 2013 enabling work on the 2012 *LBR* to commence. Additionally, we submitted records to the Rare Breeding Birds Panel for the annual report in *British Birds*, along with data for the Scarce Migrants Report.'

Bob Watts reports that 'The Rarities Committee is functioning well and currently has six members. We liaise closely with the county recorders over their decisions. Now that we are catching up with the backlog of *London Bird Reports* the reduced volume of records has made the job of the Committee easier. We try to circulate photographs of rarities as soon as possible and this facilitates the decision-making process. However, it is noted that there are significant numbers of records for sites such as the Wetlands Centre and Rainham Marshes where neither the county recorders nor the LNHS sector recorders receive records.'

Ian Woodward reports that 'Fieldwork for the *London Bird Atlas* project was completed in 2013, with additional survey work being undertaken in a small number of tetrads, including the one per cent of tetrads where timed counts had not been done in the breeding season during the main survey period (2008–2012). Work on writing up the results of the project continued during the year.'

Angela Linnell reports that the LBC Reading Circle has twelve members and circulates six journals on birdwatching. New members are always welcome. These journals are circulated for a small subscription: *Ardea*, *British Birds*, *Dutch Birding*, *Ibis*, *Irish Birds*, and *Scottish Birds*.

As always, the Committee look forward to hearing from any members, especially beginners, who want to make suggestions to improve the work of the London Bird Club. We hope you will take the opportunity to promote the Club, particularly to younger birdwatchers. We have a lot to offer — including the fact that the LNHS covers plants, insects and all aspects of natural history. We also hope you will suggest topics for our indoor meetings and come along on the weekly field trips, where you will find some of London's hidden gems with the chance of seeing some wonderful birds.

DAVID DARRELL-LAMBERT, *Chairman* (david@birdbrainuk.com),
ANGELA LINNELL, *Committee Secretary* (angela.linnell@phonecoop.coop)

Book review

The birds of London. Andrew Self. 2014. Bloomsbury Publishing, London. 432 pp., illustrations by Fraser Simpson, photographs as individually credited. £50. Hardback. ISBN 978 1 4081 9404 1.

London — or rather the LNHS recording area — contains a remarkably diverse range of habitats, the 20-mile radius based on St Paul's Cathedral embracing farmland, woodland, marshland and numerous reservoirs, quarries and ex-gravel pits, as well as the city and its boroughs, and at the heart of it all, the River Thames. In consequence, Andrew Self's account *The birds of London* can document an amazing 369 species.

The author himself could hardly be better positioned to produce this compilation: an enthusiastic London birdwatcher for in excess of thirty years, he has been editor of the *London Bird Report* (1998–2006), and is a member and past chairman of the London Bird Club Rarities Committee. All the 'rarity' records included have been accepted by that committee. He acknowledges with gratitude the enormous efforts of the huge number of LNHS members who have, over the decades, amassed the records that form the backbone database for this book.

The bulk of the text — over 350 pages (with a further list devoted to escapes) — covers the species accounts. Each of these is subdivided into Historical, 20th Century and 21st Century sections which works well in putting into perspective the bird population changes with time. A modest point perhaps, but each species status account sub-title is accorded an indefinite article — a civilized elegance rather than an extravagance in my view.

The quite excellent and informative texts illuminate the changing fortunes of the city's birdlife with supplementary paragraphs where necessary. There are numerous gains recorded: sparrowhawk, buzzard, red kite and peregrine, and of course collared dove, ring-necked parakeet (sensibly no longer considered an escape) and carrion crow are just some examples. Sadly, too, there are numerous declines recorded, well-documented in 'London Specials', like smew, swift and starling, but not so readily explained in the house sparrow or kestrel, nor in the willow and marsh tits, which if not now extinct in London, teeter on the edge of extinction. For a spiritual uplift after such depressing accounts, it is worth reading the list of locations of wintering water rail!

Separate chapters give a valuable (and useful) account of the geographical and ecological range of habitats within the recording area, with a separate section on London's Green Spaces together with a map of what amounts to the 'top twenty' areas. This amongst other things stresses the importance, past and present, of the extensive network of reservoirs and sewage farms, the latter boasting an impressive list of rare waders. There is a monthly calendar of noteworthy birds with dates and locations, and a list of documented 'first records' and dates, headed by a second-century red kite from the Roman author Aelian. Over the centuries, red kites were abundant until the 1700s, then a terminal decline in the nineteenth century led to a single last record in 1859, until sightings increased in the late 1900s, due not least to the spread of introductions originating in the Chilterns. Breeding is expected shortly! That first red kite record was followed almost two millennia later by the 2012 'first' Bonaparte's gull. Another chapter deals with ornithological luminaries associated with London over the years.

Fraser Simpson's line drawings grace the text throughout, while the colour photographs are bound in a single group. Of these, twenty are illustrations of various habitats and sites while a further forty-one are of selected species, all credited individually. Both the quality of the originals and the printing are exemplary.

If you have an interest, no matter how lightweight or how serious, in London, or urban birds, or avifaunas, or the historical record, *The birds of London* is a 'must buy'. Few comparable texts have been both so authoritatively based yet so well presented, and above all, so eminently readably written.

JIM FLEGG

Swifts — why we must help them survive and thrive

EDWARD MAYER

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**An Invited Address delivered at the Annual General Meeting
on 4 December 2013**

Why swifts?

There are two answers to this question. The first is because they're beautiful, charismatic, dramatic, beneficial and amazing, and bring such incredible drama and action to our urban skies and to our lives. Swifts can brighten up the dreariest location like nothing else, their aerobatics and calls bring great excitement and drama, their dashing flight raises the spirits of us grounded mammals.

They are also beneficial in other ways; each swift can, it is said, catch up to 20,000 insects a day, and many of those will be pests like aphids and mosquitoes and gnats. And the second answer is: because we can help them. Swifts' problems are not so overwhelming that they are, like say cuckoos and spotted flycatchers, or, to take another and completely different example, hen harriers, currently outside our ability to assist them.

Amazing birds!

By any measure of judgement, swifts (*Apus apus* — the common swift) are amazing birds, superbly skilful flyers who feed, drink and mate in flight. They've been around for so long they are almost a 'living fossil'. The oldest known swift fossil is from forty-nine million years ago. It was found in what is now the German Rhineland, in oil shale deposits, which were then at the bottom of a warm shallow tropical sea that extended from current western Germany to Scotland.

The world then was a very different place, largely covered with vegetation that resembled what we now find in places like Borneo, a hot and humid climate, with very high levels of carbon dioxide. Yet a swift much the same size and shape as the current North American chimney swift could thrive in it, so successful and adaptable was its, for want of a better description, 'design concept'. Few of its companion species have made it through to our times, indeed the museum in Glasgow displays the fossils of many amazing creatures from the same period that are no longer with us. But swifts are still with us, for the time being anyway, and if they now vanish it will be because we have made life impossible for them.

Studying swifts

When I began studying swifts, I couldn't find any UK ornithologists working on them. I had to go to Germany to find out what I needed to know, studying at the amazing observation colony set up by the great Erich Kaiser in Kronberg. But I did find two university departments that were working on swifts, in the Netherlands and in Sweden. However, it wasn't the zoologists who were working on swifts, but the aerodynamic engineers. In Sweden they are still working on swift aerodynamics, and amongst other things they have



FIGURE 1. Swifts over Barcelona — aerial drama beyond belief that lifts our spirits to the skies. Laurent Godel.



FIGURE 2. Close up of a juvenile Swift in the nest, 42 days old and just before it will depart for Africa. Ulrich Tigges / www.commonswift.org



FIGURE 3. The Senckenberg Swift, a fossil from 49 million years ago, found in what is now the Rhineland. Ulrich Tigges / www.commonswift.org

found that swifts use several highly sophisticated techniques to be able to do what they do best, fly with supreme agility, adopt extreme angles of flight, make extremely fast and violent turns, and fly both fast and slow for days on end without food or water.

Without going into too much detail, swifts use very sophisticated laminar flow technology to ensure the air runs smoothly over their beating wings, they have high aspect ratio wings, long and thin, giving them supreme 'fuel economy', like an ability to fly right across the Sahara for three or four days without anything to eat or drink, they use leading-edge vortex creating techniques to give them extra 'lift' at extreme angles of flight, and they have the 'swing wing' ability built-in to enable extremely short take offs and landings. They can also swing their entire body upwards, wings extended umbrella-like, to 'brake' instantaneously as they come in to land at high speed, stopping dead in only a couple of inches of air space.

In fact, when we observe swifts we are looking at birds that incorporate the various technologies we use ourselves in aircraft such as the Boeing 'Dreamliner', the 'Viper' F16 fighter, the Tornado swing-wing bomber, and the 'Predator' drone. An impressive list for one small bird!

New research with fascinating results

Research into swifts is in fact only just taking off again after a long period of quiescence. It is very hard to study a bird that breeds in deep crevices, that never lands otherwise, and is very prone to desert any nest that is interfered with.

And in fact the results concerning migration gained from many years of ringing swifts have not only been so extremely meagre as to be statistically worthless, but have been, we now find, wholly deceptive as to both their migration routes and their migration destinations. But new techniques are coming along that permit either 'hands off' research that does not imperil the birds, or needs to be applied to only a very few birds to produce excellent results.

Fitting data-loggers to swifts, tiny electronic devices that record time and measure exposure to sunlight, can tell us where they go. Results so far show us that, contrary to previous assumptions made from ringing recoveries, swifts spend the winter predominantly over the Congo, with sorties to East Africa. They travel there using a coastal route around North and West Africa, with

reasonably ample food and water to be encountered en route, but on the return journey we now find that they cross the sea between Central Africa and Liberia, a journey of three or four days without food or water, then do the same from Liberia to Algeria, flying right over the Sahara, a feat of endurance that is quite incredible. We have also found out a lot more about their speed; a swift has now been recorded flying from Northern Morocco to Cambridge in just two days.

Another example: radar studies over the Zuider Zee, done by the Royal Netherlands Air Force using a huge NATO radar that can spot very small birds in flight at great ranges, and can also differentiate between species, have shown us behaviours which go against older theories of what swifts do at night. The RNAF studies have shown that swifts indeed rise at dusk, but far from spending the entire night at height, they then descend to feed on insects clustered in calm spots of air over lakes and lagoons, then rise again just before dawn to then descend later at first light.

This was not just unknown, but never even suspected. The assumption, based on very little evidence, was that swifts rose at dusk, slept on the wing high up, and descended again at dawn. Maybe some do, but others certainly do not, so more research is needed! The fact that at night, large bodies of water generate supportive thermals giving the swifts a free ride up, is an interesting feature of this research, as again there was an assumption that water bodies could not generate thermals that support soaring birds.

But this just goes to show that there is so much more to learn about swifts. Their relative inaccessibility is of course the cause; it is very hard to study a bird that flies very fast, very high, and never lands except to breed.

A bit of history

Nesting swifts share our dwellings, and this often leads to the question, where did they nest before they found the eaves of our houses suitable to nest in? The answer appears to be that they nested in old woodpecker holes, in ancient trees, in ancient forests. We can still see this in the beautifully preserved Bialowieska Primeval Forest in North-East Poland, where at the last count some 600 Swifts were nesting in woodpecker holes in ancient hornbeams. Luckily woodpeckers are not only still common there, but as they make a new hole for themselves every year, the supply of potential swift nest places is assured.

Unfortunately, forests right across the swifts' breeding range, from Ireland to Beijing, are not what they were. Most modern forests are no more natural than a field of cabbages, and they are farmed in much the same way, with well-tended close-packed monocultures of trees, all the same age, all the failures carefully removed and all cropped at roughly the same time, well before maturity or decline. There's not much opportunity for either woodpeckers or swifts in those sorts of places.

So while swifts were probably mostly tree nesters, and some nested in holes in cliffs and crags and maybe in caves too, now the vast bulk of the entire population from Eire to China is dependent on our buildings.

This has probably been the case, and increasingly so, ever since the advent of the Romans, who like their many successors, in fits and starts, cleared the forests with ever-increasing gusto.

Just one example: the Great Hungarian Plain was still in the immediate post-Roman period, and for many centuries after, entirely and very thickly forested,

as was most of northern Europe, almost unimaginable now as one views the Plain's never ending flatness, touched off with wandering flocks of white geese and sheep.

It was the Romans too who built the first really substantial towns of two stories and above, giving swifts the height and access they needed, with ample space to nest underneath those perfect-for-swifts Roman roof tiles.

Some more amazing things about swifts you may or may not know

They are always flying except when they are in the nest; they can fly very high, by some accounts very high indeed, for example when crossing the Himalayas. I have seen white-throated swifts flying at about 8,000 feet up through the Black Canyon in Colorado in April, heading north against a blizzard, a scarcely credible testimony to the birds' strength and endurance.

Our own common swifts can travel well over 14,000 miles every year in their migrations to and from Central Africa. They are slow breeders, with an average of 1.5 chicks per nest per year (maybe two if the weather is good, maybe none if it is bad) but can live an average of seven years or even into the high teens.

They usually suffer little predation (not many things can catch them, apart from falcons); they are faithful to their mates (though they part for migration and join up again upon return) and they are incredibly faithful to their nest sites, battling frantically to get into an old nest place that has been blocked off by new tiles or roof repairs, sometimes even injuring themselves in the process.

A swift's journey

(As described by Graham Appleton in *BTO News* 299: pages 16–17, May–June 2012: 'Swifts start to share their secrets').

This example was measured by using a data-logger fitted to the bird's back, as already described.

Setting off from Fowlmere, Cambridge, UK on 23 July 2010

Madrid	26 to 28 July	D. R. Congo	17 August to 9 December
Senegal	1 to 5 August	Malawi	13 to 21 December
Congo Brazzaville	12 to 15 August	Mozambique	22 December to 24 January 2011

The return journey, setting off from Mozambique on 24 January 2011

D. R. Congo	5 February to 6 April	Algeria	1 to 2 May
Cabinda, Angola	9 to 14 April	Morocco	3 to 6 May
Liberia	17 to 28 April	Cambridge UK	8 May

Speed and endurance — incredible!

The big surprises here were the speed of certain stages (as mentioned above, Morocco to Cambridge in two days) and the use of Liberia as a refuelling stop. There had been no records whatsoever of swifts from Liberia until this, and other parallel surveys using more data-logger-equipped swifts, followed up by human observation on site, showed the great importance of Liberia (which still has some remaining areas of insect-rich equatorial rain-forest, though it is being heavily exploited for timber) as a refuelling stop.

The journey from Cabinda to Liberia was over the sea, a three-to-four-day flight with no food and no water. A similar flight was done over the Sahara, a four-day flight with in all likelihood very little food, and no water. Such extremes of swift endurance had never before been proven.

Swifts decline in the UK

The combined UK and Irish common swift population was estimated by the British Trust for Ornithology at around 100,000 birds between the years 1968 and 1972. Subsequently they estimated a population loss by 2010 of 38 per cent in the UK and of 46 per cent in Eire.

Beyond any doubt, swifts now depend on our older buildings for nest places, and typical places where you will find them nesting here in the UK are in the eaves of pre-war housing, in ventilation holes and slots in 1960s apartment blocks, and in accidental holes, gaps and fissures, usually caused by neglect and botched repairs, in almost any structure over five metres high.

In fact they are verging on the impossible to count nationally with any assurance of success. Those swifts feeding low over the local gravel pit may indeed be local, or they could just as easily have flown in from Scandinavia, France or Holland (or in Northern Ireland, from Scotland) if feeding conditions there are abysmal, due to the rain and cold weather removing all flying insects from the air.

We find that it is very much more reliable to assess swift populations by counting carefully and repeatedly at local nest sites, using local observers who have the ability to put in the necessary time for repeated visits.

It is enough to say that we are losing our swifts at a spectacular rate. True, this is not a phenomenon confined to swifts, but it is happening to an urban bird, right above our noses, and yet hardly anyone noticed the fact until we started campaigning for them some fourteen years ago.

Swifts have, in just sixteen years (1995–2011), declined massively. In addition to the national estimates above, figures assembled and published by the British Trust for Ornithology show:

Decline of the UK swift population 1995 to 2011

Scotland	-57%	East of England	-14%
Wales	-44%	West Midlands	-27%
NW England	-42%	SE England	-49%
Yorkshire	-43%	SW England	-51%
East Midlands	-58%	London	-43%

But local counts can show more dramatic population losses. In Louth in Lincolnshire, a loss of 75 per cent has been estimated.

The primary reason appears to be simple enough, loss of nest places. While there is always someone out there saying '*It must be something going on in Africa*', this is not supported by any discernible facts. Nor does climate change seem to provide any answer yet, though if the succession of very cold and wet early summers that we have experienced in the past few years (but not, thankfully in 2014) continues, it may well turn out to have a significant role.

We receive many reports from local people observing their individual colonies, and here anecdotal as well as expert evidence is perfectly legitimate.

When someone tells me '*There used to be swifts in Barnet General Hospital until they demolished the Victorian Ward Blocks*' or '*I have just seen the roofers throwing the chicks into the skip*' (both genuine quotes, I am sorry to have to say) or you are shown eaves where swifts used to nest until liquid insulation foam was pumped in to seal them up, then you get a pretty good idea how swifts lose their nest places, with, in all likelihood, if they survive, and given the type of rebuilding going on in this modern world, no new ones to go to.

In fact, from what we have learnt over the years, there is a very good case for considering swifts as the wild bird perhaps most frequently and abundantly killed directly by human agency, if we leave out deaths caused to other bird species by introduced alien cats and squirrels and by collisions with our buildings and cars.

But in addition to all this needless slaughter, the many changes to the way we build have passed almost unnoticed by the ordinary person like you and me, and even to ornithologists, and it is this total change in how and what we build, as well as what we build with, that is, we now think, causing swift populations to crash.

New building technologies, reroofing and insulation — the main reasons for decline

Up to the end of the nineteenth century, houses and bigger buildings were made predominantly of stone, brick and timber. These hygroscopic materials required constant and copious ventilation if they were not to decay or rot, and so buildings were given very high amounts of both internal and external ventilation. This ventilation, with its holes and vents and gaps, provided swifts (and bats too) with a good choice of places to nest in, and so their populations may in fact have reached their peak around that time.

But come the new century, and new materials started to appear in buildings, especially the larger ones. Steel, reinforced concrete, plate glass, Portland cement, rubber, plastics, all were new to this field, and all combined to produce a type of building that was sealed, used damp courses and water-resistant materials to keep out the groundwater, and used mechanical ventilation to change the air inside.

A typical example of this would be Selfridges, one of London's earliest Chicago-style steel frame cage structures that set the fashion for the new ways in building. Another, rather surprisingly, is the neo-Gothic Houses of Parliament, that had one of the first ever 'air-conditioning' systems, to clean the London soot out of the air MPs were breathing and provide them with a comfortable working environment. Both such technologies ensure that a building either needs much less ventilation, or needs only mechanical ventilation, and the result is effectively swift-proof, without those unguarded holes and vents that enable swifts to wriggle in and make a nest.

Domestic building was very slow to adapt to these new ways of building and ventilating, and builders still built houses using swift-friendly brick and slate and tiles and wood, with very little regard to the new materials, until well into the twentieth century, indeed right up to the Second World War.

But after the war, changes in the Building Regulations made matters much worse for swifts, with all vents having to be bird and insect proof. As a result, buildings erected since then, as well as modernized and restored older ones, have proved useless to swifts as breeding sites, as they cannot gain any access to them. Particular problems for swifts (and bats too) come from all forms of

insulation, loft, cavity wall and external solid wall types, which obliterate or prevent access to existing nest places, and present a dangerous, even fatal barrier to swifts who try and burrow their way through it to reach their former nest sites.

It is not just the individual householder who, cursed with ignorance, destroys swift nest places with ill-timed reroofing work in the summer, or by the installation of insulation. Housing associations, with their massive portfolios of sometimes thousands of older properties, are it seems the very worst culprits in the elimination of swift colonies.

We have been told quite often of housing associations that have, at a stroke, made swifts extinct on entire estates and along whole streets by reroofing, replacing wooden soffits with plastic ones and installing insulation, quite often even during the breeding season, in some cases, ignoring residents' pleas to 'save our swifts'.

In fact, I received in just one week in late July 2014, two reports of the wholesale slaughter of swifts' chicks during mass reroofing jobs done by housing associations in two English towns. A delay of just a couple of weeks to the work would have saved the entire population.

The reason is simple; housing associations are there to provide basic housing at the lowest possible cost. Nothing else, just the very basics. Swifts, who provide drama, interest, excitement, pleasure, diversion, and who above all animate the built environment, and add a breath of life above the concrete urban jungle, don't get a look in.

Despite there being legal protection for nesting swifts and their nests during the breeding season, there is we have found almost nothing that can be done to stop such acts, apart from trying to get the local media involved. While I have heard of a successful prosecution in Belgium, and attempted prosecutions in Poland for the destruction of swift colonies, I have never heard of such a case coming to court here in the UK.

If you encounter such goings-on, my advice is to call the RSPCA, as well as the RSPB's bird crime unit, but make sure that you have convincing (preferably photographic or video) evidence. You have to have it or there won't be any case to answer, and again from our experience, those involved will remove the evidence very promptly once they find observers are there.

These are the attitudes we have to change, and the way we do it is by stressing the beneficial health, social and cultural benefits to be gained from 'greening' the grim urban environment with enhancements to biodiversity. The way to do this is by firstly preserving existing swift colonies, and then, just as important, installing new ones in all newbuild properties.

Most refreshingly, this was done at the Fulbourn village estate in Cambridgeshire at the request of the residents, who formed a group to ensure 'their' swifts moved with them from their old houses into the new ones being built. Intelligent, well-informed and enlightened attitudes ensured that it was a success (see below for more details), and the new houses are being marketed as the 'Swifts' Estate', an acknowledgment of their improved monetary value, a unique selling point attracting new residents.

Our attitude to nature

One can easily observe that as a population we are becoming more and more alienated from the real world, and the 'wild' life in it. Now over half the world's population lives in towns and cities, and as our activities expand to cover and

change more and more of the planet, there is an alarming tendency for the public to think of wildlife as just something one watches on TV, on a laptop, tablet or I-Phone, and for administrators, corporations and politicians to move us towards an end-game where what little wildlife is left is confined to nature reserves, and the rest of the land is managed to exclude everything except crops and humans.

Nor is the total exclusion of wildlife from our daily lives unwelcome to many. Sharing your home with wildlife, be it house martins, swallows or swifts, and especially bats, may not always be such a popular option, at least to the unenlightened and unsympathetic, and the ‘squeaky clean’.

Children brought up on the monstrosities of Disney©®, and grotesque ‘Petting Zoos’, where every animal has to be cute and/or cuddly, will not have any understanding of how the real world works, let alone what the real rules of survival in it are, or why we actually need wildlife that isn’t friendly, cuddly or cute.

Our curious attitude to Planet Earth, and our complete exploitation of it to the point of irreversible destruction, is unique amongst living sentient creatures (only bacteria have the same behaviour patterns).

For it is quite clear what the effect of humanity is on any part of the planet. As soon as *Homo sapiens* arrives, all other life-forms start to die off, whether eaten, killed for their fur or for fun, wiped out as ‘pests’, accidentally poisoned, or just edged aside, leaving only those species that can adapt to the human presence, the so-called vermin, like rats, mice, feral pigeons and pariah dogs, or the dreadful man-made mistakes, like cane toads in Australia.

Swifts were lucky for a couple of thousand years; while we quickly destroyed all their original nest places in ancient woodpecker holes in ancient trees, we inadvertently created new ones for them, in our buildings. That was good for only a while though, until we completely changed the way we built our dwellings and workplaces.

Climate — starting to have an effect?

Further problems have arisen from atypical climate events. The recent short series of long, cold and wet early summers has not just stopped swifts from breeding, it has killed many of them from starvation and hypothermia. In the early summer of 2013 there were reports from Spain, France and Switzerland of swifts dying en masse, falling from the sky and covering roads with their corpses, or falling exhausted into the Swiss lakes while trying to feed during pouring rain, and being eaten by gulls. This year, 2014, has been very much warmer, especially during the key period of early summer, and swifts appear to be doing well, though in some cases in reduced numbers from previous years.

Insecticides

Agricultural insecticides are almost certainly a component in the decline of swifts, who after all eat only airborne insects, and include aphids and other crop pests as a significant part of their diet.

Recent studies* have shown that farmers in Sussex are treating their rapeseed twenty-two or more times per crop. This massive burden of chemicals, some of them powerful poisons, most likely used quite unnecessarily, with many of them apparently retained in the land for years afterwards, or washed who knows where by the rain, is not good news for wildlife, and probably goes a long way to

* ‘Are pesticides responsible for bee declines?’ Prof. Dave Goulson presentation, Life Sciences, University of Sussex, UK, 2013.



FIGURE 4. Bayer's Neonicotinoid 'Ultimate Bug Killer'. Edward Mayer/Swift Conservation.

explaining why many farmland and migratory insectivorous birds are vanishing from our landscape, swifts included.

The latest and most worrying of the insecticides in common use, the neonicotinoids, (apparently 7,000 times as toxic as the banned DDT) are being blamed for the decline in bees, but being insecticides, they kill all insects, wholly regardless of species.

The European Commission (EC) has placed temporary restrictions on their use on bee-attractive crops (and both Italy and Germany have restricted their use even further), but in a move that is particularly troubling, the manufacturers are pressing hard for the restrictions on the uses of their product to be overturned.

(<http://www.syngenta.com/global/corporate/en/news-center/news-releases/Pages/130827.aspx>)

What can be done about all this?

If we are going to remedy the situation what do we need to do? There are several ways forward; the first thing we need to do is to stabilize the swift's decline. The next is to assist the recovery to something approaching, we suggest, the position before the Second World War, when an estimated 7 per cent of all housing could accommodate swifts, or even, if we can, the 10 per cent availability of pre-First World War buildings*.

Stabilization

Saving existing nest places, and establishing new nest places, requires expert knowledge, not just of swifts but of buildings and building technologies. With our background in building maintenance, as well as our knowledge of and passion for swifts, we supply training on supporting and enhancing biodiversity in the built environment to architects, planners and developers. We have worked with corporate bodies such as Marks & Spencer, and ARUP Associates to get the message across and create exemplar projects. We give talks on swifts to all who are interested in them, including natural history and ornithology clubs and local civic societies. We also supply leaflets on all aspects of building for swifts, downloadable from our website.

* 'Homes for birds'. *British Birds*, UK, November 2002.

Controls on biocides

I do not use biocides in my garden; if any plant is ruined by pests, I just rip it out and replace it until I find ones that are pest resistant. Now I have a lush garden full of some amazing plants, great insects and birds, and no pest problems at all. Growing hostas meant maintaining a constant killing field for slugs and snails — so forget hostas! I have fine Dragon and Italian arums instead. Nothing eats them.

Better control of insecticides and herbicides is a priority. I recall only too well when my parents lived next door to a farm. When the farmer sprayed his orchards, hedgehogs would crawl into my parents' garden to curl up and die. Doubtless they had been feasting on the incapacitated insects. With the farmed 'countryside' now little more than a free fire zone for the use of chemical weapons, urban areas have now become a last-chance reservoir for some of the wildlife that has been eliminated elsewhere.

With some insectivorous birds now vanishing at a spectacular rate, we can probably wave goodbye forever to the cuckoo and the spotted flycatcher, and others are very likely to follow.

I suggest that because of this, there is a very good argument that biocides should never be authorized for use by untrained people. Time and again I have found gardeners using banned biocides that they have had sitting in their potting sheds for the past God knows how many years, and to what purpose?

I even once met a farmer who was using a Dutch chemical to prevent birds eating his seeds; totally unable to read the label he had no idea whatsoever what the chemical was or did, but someone had given it to him saying '*This is the stuff that will do the job*'. This same farmer used to dump his used chemical containers in the local drainage ditch. He didn't even bother to put the caps back onto the containers. And we wonder why our wildlife is in decline.

Before the First World War, if, like Sherlock Holmes, one wanted some cocaine, then one could buy it from any chemist. Now such dangerous drugs are either not sold at all, or are available only on prescription from a doctor. I suggest the same is needed now for the control of all insecticides and biocides. They are simply far too dangerous to be on open sale to anyone, as their misuse is so prevalent and their effects are so devastating.

Government action

The EU has required member governments to halt all further loss of biodiversity by 2020.

<http://ec.europa.eu/environment/nature/biodiversity/comm2006/2020.htm>

Their highly praiseworthy aim is:

'Halting the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restoring them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss', but it has to be noted that the similar objectives of their previous policy were not met.

The UK Government in 2010 issued '*Biodiversity 2020: A strategy for England's wildlife and ecosystem services*', with the highly laudable aim: '*to halt overall biodiversity loss, support healthy well-functioning ecosystems and establish coherent ecological networks, with more and better places for nature for the benefit of wildlife and people.*'

But the trouble with this sort of approach, if it ever does result in any meaningful results (and the signs are not good that it will, if only because the

post of Secretary of State for Environment, Food and Rural Affairs has been 'shuffled' and refilled three times since 2010), is that it tends in its detailed execution to view 'nature' as something that should exist exclusively in 'nature reserves', and wildlife established within the urban environment, and as with swifts almost wholly dependent on the urban environment, gets missed out.

Local government can help

So we have to try and tackle the problem from another angle, and one way in which swifts are getting new nest places built for them is through local government action. Legislation put into place by the last Labour government, specifically Section 40 of the Natural Environment and Rural Communities Act 2006:

'places a duty on all public authorities in England and Wales to have regard, in the exercise of their functions, to the purpose of conserving biodiversity. A key purpose of this duty is to embed consideration of biodiversity as an integral part of policy and decision making throughout the public sector, which should be seeking to make a significant contribution to the achievement of the commitments made by Government in its Biodiversity 2020 strategy.'

This is a very intelligent aim, but is hampered by cuts in expenditure, and I dare say a lack of interest, knowledge and commitment too in some places. However, some enlightened councils are using this legislation, coupled with their own biodiversity policies and in some cases helped by our training, to require the installation of 'green' features benefitting local urban biodiversity as conditions within Planning Consents.

So nest boxes and nest bricks for swifts can be required as biodiversity components in new build and renovation projects. Within Inner London, both Camden and Westminster Councils have made swift nest places a Planning Permission requirement, but of all the areas where local government has done this, Exeter stands way ahead of the others both in numbers of nest box schemes, and the range of buildings that they have fitted them into, while South Cambridgeshire has successfully implemented two of the most sophisticated nest place schemes yet seen here in the UK, the Fulbourn Village project, and the Cambridge Swift Tower.

Do-it-yourselfers can really help!

If you do DIY, then you can help swifts too. One of the more cheerful episodes in bird conservation (though it stems from entirely avoidable mistakes), concerns two species in the USA, the purple martin *Progne subis* and the eastern bluebird *Sialia sialis*. Both these birds are hole nesters, and were inconvenienced to the point of near-extinction when starlings *Sturnus vulgaris* were imported to North America by the American Acclimatization Society.

Apparently one of their aims was to establish populations in the USA of every bird mentioned in Shakespeare's plays, so the starling (mentioned in Henry IV, part 1), was liberated in New York's Central Park, a release of one hundred such birds turning into a population of 200 million by the twenty-first century, the cause of much damage to agriculture, as well as to the native species that they supplanted.

The result for the purple martin and the eastern bluebird was dire. Starlings took over their nest holes, and this, coupled with massive deforestation (they lost their nest holes in the trees), set the seal on their decline to near extinction.

They were both rescued by the public taking up the challenge and offering them artificial nest places. While neither species is back to its former numbers (indeed the purple martin is in trouble again, but this time from problems in its wintering area of Central America), there are an estimated million or so people who have put up nest boxes for them, and the result is that both species are still with us. It gives us hope for swifts, who will take up carefully positioned nest boxes fairly easily.

Not only is it just as easy to make a swift nest box as it is to make one for blue tits (you can download designs from our web site), it is also easy to buy them.

A very wide range is available, from simple plywood costing about £15, to big double nest boxes, made from a wood pulp and cement mixture, costing about £150, that offer separate places for bats too. You can find many of them illustrated on the Shopping Page of our website.

Most of them are easy to fit and maintain, though some are heavy enough to need access equipment like cherry-pickers or scaffolding to get into position, so are more an option for builders and commercial concerns.

The best solution of all — permanent nest places

While DIY efforts can only do good, we do believe that the best possible way to improve opportunities for swifts is to create permanent built-in nest places in as many new buildings as possible.

Back in 2010 we approached the relevant Minister in the current government to discuss such an option, but to no effect; our suggestions were met with politeness but that was as far as it went. Doubtless we were considered just another bunch of sentimental softies keen to place yet further burdens on the UK building industry.

So now we travel to the same destination by another route; as described above, we look to local authorities to assist swifts' survival through Planning Requirements for swift nest places to be built into all suitable new build properties. The reasons are straightforward enough; built-in nest places are safer, more weatherproof, need little or no maintenance, won't be removed so easily, and last very much longer than boxes fixed to the exterior of any building.

Products known as 'Swift Bricks' are now readily available on the market. The initial models, made by a German company called Schwegler, have been supplemented by ones made in the UK, where at least three companies (Ecosurv, Bird Brick Houses and Ibstock Brick), are making them, and by a company in the Czech Republic. There are even models that fit into the sort of insulation that is fitted to the outside of buildings under various insulation schemes such as the UK's 'Green Deal'. It is easy enough for building-site carpenters to make up simple plywood nest boxes that can be hidden away in walls and eaves too.

Permanent inserted boxes need no, or very little maintenance (swift nest places do not need to be cleaned out). They are much more resistant to the weather, much more resistant to overheating or overcooling, and far less likely to be removed for whatever reason by new owners or tenants. Once in place, they are in for good.

All these nest places are extremely simple to use; they are usually just inserted into the upper levels of walls as an alternative to bricks or concrete block work, or within the insulation layer, and the result is a permanent nest place for a pair of swifts.



FIGURE 5. Swift nest boxes inserted into an apartment block in Poland during external insulation work. Zofia Brzozowska.



FIGURE 6. An Ecosur Swift Brick being inserted by a bricklayer into a wall; a permanent nest place for Swifts. Chris Lowe / Heather Ball.

Below are shown just a few examples of recent projects in and around London and the South-East that have used swift bricks or built in/on nest places:



FIGURE 7. Schwegler Swift Bricks have been inserted into the upper wall of this health centre in New Barnet. Edward Mayer/Swift Conservation.



FIGURE 8. The Lister Maternity Hospital — with Swift Bricks installed (see close-up below). Tim Hill HMWT.



FIGURE 9. Close-up of the Schwegler Swift Bricks. Tim Hill HMWT.



FIGURE 10. One of the contractor Niblock's workmen cuts special entrance holes for swifts into new soffits on an Ealing Council estate, at the request of the residents. Beth Hales.



FIGURE 11. Swift nest boxes being installed during insulation work on an apartment block at the Regent's Park Estate, Camden. London Borough of Camden.



FIGURE 12: Swift nest boxes fitted to the new lift shaft at Hackney Central Overground Station. Edward Mayer / Swift Conservation.



FIGURE 13. Two Schwegler double swift boxes were inset into the walls of this new hotel in Brighton as part of a planning requirement. Ben Kimpton / The Ecology Consultancy.



FIGURE 14. A swift leaves its new nest brick at a renovated hospital in Brighton. Chris Lowe / Heather Ball.



FIGURE 15. Swift nest boxes made from recycled plastic fitted to the Olympic Stadium building at Stratford. Dafydd Coe, Hyland Edgar Driver.

Swift towers

Swift towers are another way of providing swift nest places in bulk at reasonable unit cost, and are also a way to create a very large number of nest places in one go. Based on the fascinating history of breeding swifts in man-made nesting towers in north-east Italy (special towers were built from about 1400 onwards for swifts to breed in chambers created in the walls for them; their chicks were 'cropped' as a luxury food), swift enthusiasts are designing and building new swift towers.

New swift towers are now operating in Northern Ireland, England, Germany, Poland, the Czech Republic and Slovakia, while historic swift towers in Italy are being refurbished for reuse. Already famous examples can be found in Cambridge and Warsaw, while in Berlin a landmark water tower has been equipped with internal nest boxes.



FIGURE 16. The top of the Castellaro Swift Tower outside Modena, in NE Italy, home to many Swifts; see the nest holes. Mauro Ferri.



FIGURE 17. An old air raid shelter in Frankfurt, converted to use by swifts. Ingolf Grabow / Frankfurt Swift Group.



FIGURE 18. The Cambridge swift tower. Dick Newell / Action for Swifts.



FIGURE 19. The new Warsaw swift tower, now being copied in Exeter. Menthol Architects.

What can you do to help swifts?

The best place to start, indeed the only credible way, is to survey your local colonies so that you know where they are, so you can protect them. If you belong to a club or society, try and get your fellow members to join you in this; surveying swifts just before summer dusks is not just great fun, but really worthwhile work.



FIGURE 20. Historic Berlin water tower, still in use and also hosting swift nest boxes.
Ulrich Tigges / www.commonswift.org

How to survey your swifts

While swifts are easy to see screaming around on a hot summer's evening, they are often quite discreet about where they nest, visiting at speed, so fast they can easily be missed. Yet knowledge of where they occur and nest is essential if we are to persuade government to improve their protection, and make places for them in the built environment.

There's a way to tell if they are nesting nearby. If the birds are flying low along eaves and roofs and round houses, screaming as they go, then they are certainly nesting in the near vicinity, perhaps in the houses they are flying around. But if you see them flying slowly, drifting along, heading steadily in one direction, then they are probably migrating.

Take a local walk around neighbouring streets in the couple of hours before dusk; look out for screaming swifts flying at roof-top height (not those high flying swifts, they could be from almost anywhere). Count them again and again until you have a good average figure, then note that together with the street or building address.

Report the figures to the RSPB via the link on our website's home page. Keep the figures yourself, and most important of all, use them to help swifts!

How to protect your swifts

When you know where your local colonies are, you have all the information necessary to protect them.

Using your notes, keep a close watch on the buildings that have swifts nesting in them. If you see any threat (Planning Notices, scaffolding, roofers at work), you need to act immediately to save the swifts.

Swifts are of course protected by law, and the Police, the RSPCA and the local council's Biodiversity Officer as well as the RSPB's Bird Crime Unit can all play a major role in preventing or stopping activities that threaten swifts.

Discreetly collect evidence (photos, videos, corpses), but do not risk a violent confrontation. Then contact the Police, call 999/101 and report what you have seen. Always obtain a crime incident number from the Police otherwise the case may not be followed up. If swifts are being or have been injured or killed, then call the RSPCA (03001234 999): they are obliged by law to investigate every incident reported to them. Then contact the RSPB Investigation Unit on 01767 680551 (out of hours mobile 07803 241452 / 07885 255830).

Inform the local Council's biodiversity officer of what is going on, and keep them in the picture.

Convert your home into a home for swifts

A very worthwhile thing to do, and a potential source of never-ending satisfaction is to create nest spaces in your own home for swifts. You can speed up the process of getting the nest boxes occupied by playing swift calls to lure them in.

Figure 22 shows the basics. For lots more essential information please see our website and our leaflets (freely downloadable). To support our activities, we sell the swift calls CD and MP3 recordings at very low cost, and supply full instructions on playing systems and how to set them up.

How to keep Swifts in your home. safely and cleanly

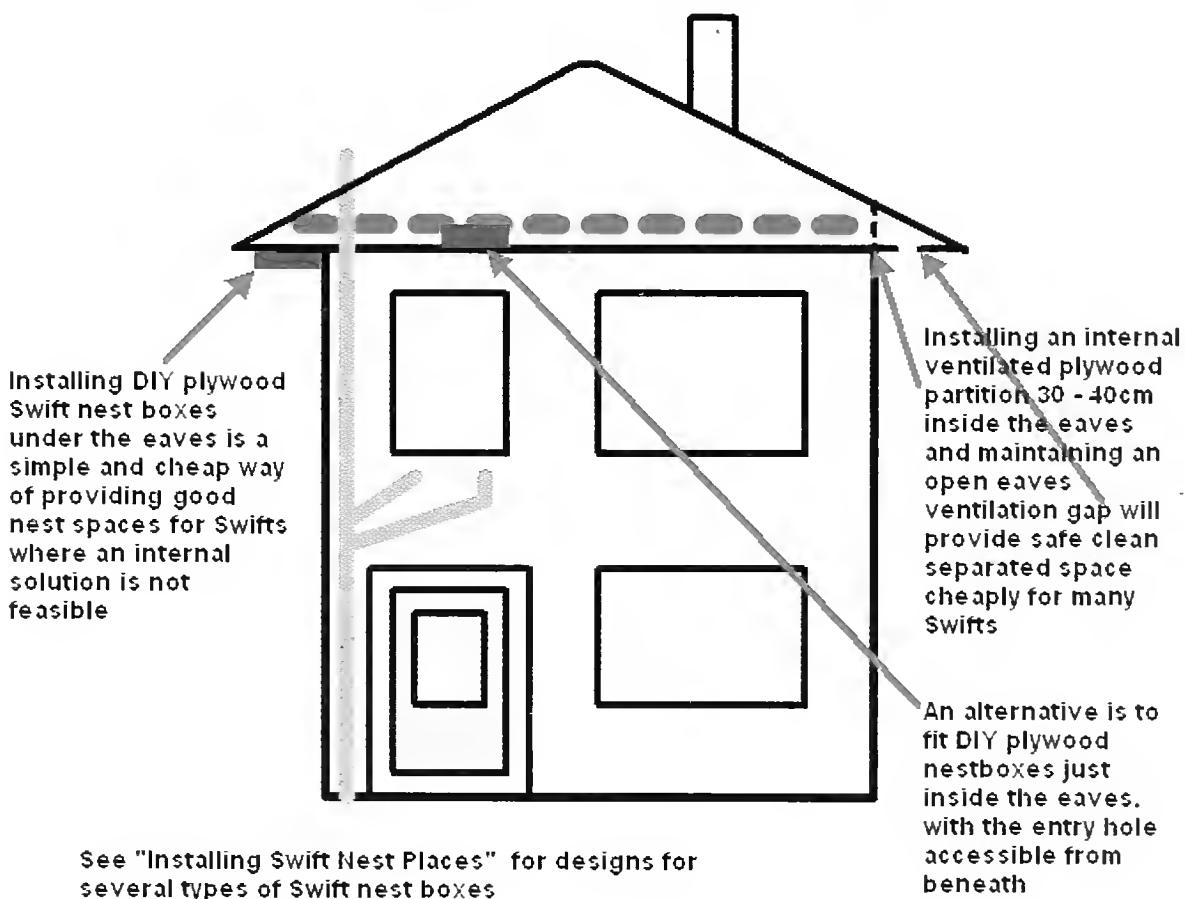


FIGURE 21. Keeping swifts in your home. Edward Mayer / Swift Conservation.

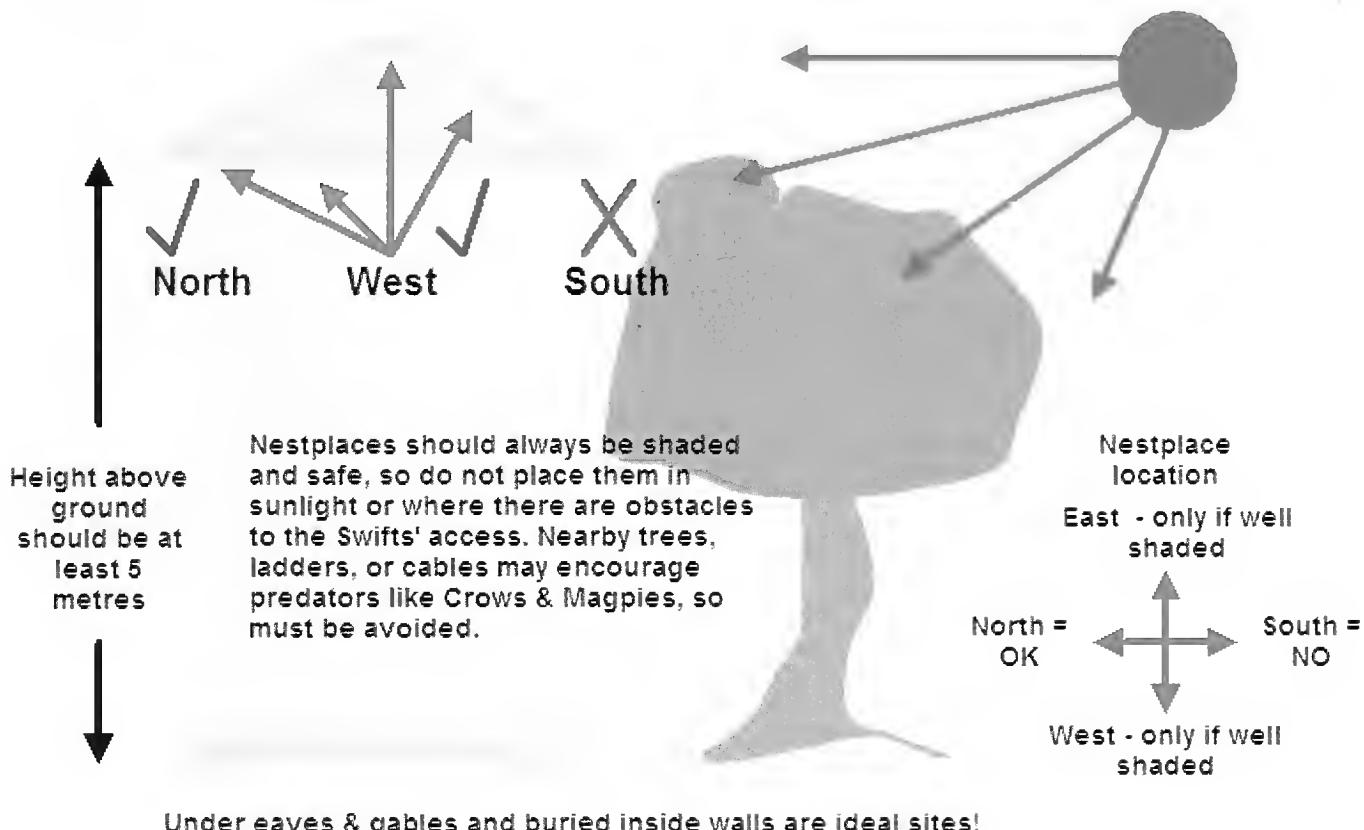
Creating local 'swift consciousness'

By far the best way to help swifts and prevent this sort of problem in the future is to create a local consciousness and awareness of swifts and their problems. Write to the local paper, ask your councillors to adopt swift-friendly policies,

get the word and the knowledge around. Then it won't be such an uphill task to help the birds when they are in trouble; people will at least have an idea of what you are talking about.

And, most important of all, ask your local Housing Associations and the Council to require swift nest places in all new or refurbished developments. It is always easier and cheaper to do this when other jobs are being done, as that saves on the cost of scaffolding and access equipment.

Put up lots of nest boxes:



Where to install Nestplaces for Swifts

FIGURE 22. Positioning nestplaces. Edward Mayer / Swift Conservation.

The best sort of swift nest box project

As mentioned above, we recommend that nest boxes and places are inserted permanently into the fabric of the building.

Below are photographs from the famous Fulbourn 'Swift' Village in Cambridgeshire. At the request of the residents, Rob Mungovan of South Cambridgeshire District Council managed a project with input from Swift Conservation to enable the many swifts to move from their old nests to new ones, as the estate was demolished and rebuilt.

The new boxes that were to be inserted deep within the walls were designed by us and made on site by the carpenter and were made from 12.5 mm plywood and 100 mm plastic drainpipe. If you are making such boxes then make them as a minimum internally 300 mm wide, 150 mm deep and 150 mm high.

Some seventy of these boxes were installed inside the insulated walls of the new houses being built there.

Once the boxes and installation were in place, the bricklayers finished off the walls and fixed Schwegler nest place entrances onto the fronts of the plastic entrance tubes.

That they work you can see from the photo below, of a young swift scanning the world outside before setting off on its first three-year-long flight. In fact, the local swifts prefer these internal boxes to the external boxes also used at the same site.



FIGURE 23. Simple plywood box with an entrance tunnel made from 100 mm drainpipe. Rob Mungovan SCDC.



FIGURE 24. The box entrance tunnels protrude from the insulation layer. Rob Mungovan SCDC.



FIGURE 25. The finished boxes in situ, showing their Schwegler entrance plates. Rob Mungovan SCDC.



FIGURE 26. It works! A swift chick views the new world outside. Rob Mungovan SCDC.

The challenge

In Germany the Frankfurt Swift Group (ingolf.grabow@gmx.de) has put up over 1,500 nest boxes for swifts since it started a few years back, and in our own East Anglia, Dick Newell's 'Action for Swifts' (dick.newell@gmail.com) group has now created over 800 nest places for swifts, in churches, on council estates and in office complexes. In fact, institutional and commercial sites can often be the best for this sort of enterprise, as once agreement is reached to install them, there is an existing maintenance scheme available to manage and support them.

The situation for swifts is really pretty dire

If we don't act now then swifts are a very real candidate for extinction, or near extinction, within the next twenty years. Extinction of once-common birds is happening all around us, right now. I haven't seen a spotted flycatcher in the UK in the past three years. But back in 1998 I found three nesting pairs in just one large East Anglian garden. I heard just one cuckoo calling in the UK last

year, none this year. The last thing you will be wanting to do in 2034 is to get on an RSPB coach trip to see one of the last remaining colonies of swifts here in the UK. We must be realistic. No one else is going to help our birds except us, so we have to do it all on our own. And we can! Set up a local Swift Group, and get cracking! Others have done it with brilliant results.

Please help swifts!

Lots more information on helping swifts is available from our website at www.swift-conservation.org. All our leaflets can be downloaded free; we encourage you to print them out and pass them on to your friends and acquaintances.

© Edward Mayer — August 2014.



Swifts as we used to see them. Artwork © Dawn Painter.

Book review

The natural history of the Isle of Sheppey. Kent Field Club. *Transactions of the Kent Field Club* 18, 2014. 270 pp., colour illustrated. Limp covers. ISBN 978 0 956 1926 4 6. £12 plus £2 p. & p., cheques payable to Kent Field Club, from B. A. Mason, Corncroft, Daltons Road, Chelsfield, Orpington BR6 7QF. Or online from Kent Field Club website: www.kentfieldclub.org.uk

The first couple of lines of the first article in this useful volume indicate that it represents the proceedings of a 'Kent Wildlife Conference' on 'The natural history of the Isle of Sheppey', but I could find no indication of when or where this was held. Nevertheless, it will be a welcome volume for anyone with an interest in Sheppey, and in the natural history of the Thames region and of south-east England generally. The list of contents, on the rear cover, indicates sixteen articles by thirteen authors. The subjects range from geology and landscape through lower and higher plants to arthropods, birds and mammals. Some articles describe and discuss ecological subjects and conservation; and there is a gazetteer to nearly 200 place names and sites which will be useful to those specifically interested in Sheppey.

Most of the articles seem sound and thorough, some (such as the two by my one-time colleague Ian Tittley) even scholarly, but a map of the island supporting all the articles might have been useful. I was surprised to learn that most of the coast of the island, and much of the inland region, are designated conservation areas. The biggest proportion of these designated areas is the wonderful RSPB reserve in the south-west of the island, but other major agencies have reserves on the island too.

If you have an interest in the subjects covered, buy it soon before stocks are exhausted.

PAUL CORNELIUS

Richmond Park red deer: variations in antlers of known-age animals

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Abstract

The antlers of thirty-two red deer *Cervus elaphus* from Richmond Park, which had been tagged within a few days of birth, were measured and photographed to determine the variation within males of the same age. With increasing age there were trends for increasing length of the beams, brow tines and bez tines, and the internal span, but with overlap among categories. By the age of five years and older, minimum lengths of 80 cm and internal spans of 60 cm had been attained.

Introduction

During the years 1965 to 1975 the late Donald Chapman was licensed to ear-tag newly born deer in Richmond Park. The red deer calves were tagged in late May and June (Chapman 2012). When deer were culled various specimens were collected and when accidents occurred usually the whole body was obtained. Culled deer were given a reference number preceded by a letter allotted to that cull; whole animals were given a number prefixed by DIC. Accidental deaths occurred throughout the year. Males were culled in August and September: more than 70 per cent were culled before the age of five years. The oldest known-age stag was culled when ten years old because his head was very poor, the antlers respectively 36 cm and 13 cm long, both unbranched (Chapman 1988). This concurred with a widely held view that 'going back' usually begins at nine to eleven years (de Nahlik 1979).

The present note reports on all available pairs of antlers, thirty-two, from known-age animals, ranging from second to seventh heads, showing the variations that occur within males of the same age. In some cases two or more deer shared the same years of birth and of death so had experienced the same environmental conditions throughout their lives. However, their status within the hierarchy may have influenced their access to the most favourable feeding areas or to supplementary feed. Nutrition, as well as genetics, is a major factor in the development of antlers (Chapman 1975). The red deer winter population was about 250 – 350 head, sharing the 950 hectares of the Park with a larger population of fallow deer *Dama dama* and also in some years with sheep for six months of the year.

Method

Seven of the measurements taken of antlers on the skull were as described by Trense et al. (1981). In addition, if a bez tine was present it was measured. A flexible plastic tape was used except for the maximum inside span and the

TABLE 1. Richmond Park red deer antlers.

Year born	Length		Brow tine		Bez tine		Trez tine		No. tines		Coronet circum.		Int. span	Tip to tip	Ref.
	L	R	L	R	L	R	L	R	L	R	L	R			
Second heads															
1967	49.5	50	14	13.5	-	-	18	15.3	4	4	13	-	-	-	D25
1968	54.5	55	17.5	14	-	-	6.5	-	3	3	13.5	13	45	32	H8
1969	n.a.	57	16.5	18	-	-	17.5	14.5	3	4	n.a.	16	n.a.	n.a.	DIC161
1971	40	41	17	12	-	-	12	8	5	5	14	14.5	40	43	L49
1971	56	58	20	17.5	18.6	17.5	18.5	18	5	5	16.5	15.5	35	33.5	L26
1971	53	57	21	21	-	-	18	18.5	5	5	18.5	18	34	35	L55
1972	59	59.5	14	17.5	-	-	14.5	14.5	4	5	15	15	44.5	31.5	M2
1972	40.5	41.5	10	12	-	-	14	11	4	4	14.5	13.5	29	12	M9
1972	52	54	14	16.5	-	8	17	16.5	4	5	16	16	40.5	20	M21
1973	61	61	15	mal.	-	-	10.5	.mal.	4	4	16	16.5	42	39	P36
1973	63	62	21	22	-	23	21	27.5	4	5	18.5	18	38	21	P42
1974	46	48	11	12	-	-	6	5.5	3	3	13	14	n.a.	n.a.	R1
Third heads															
1965	60	61	19.5	18	17	1.5	18	17	5	4	15	15.5	n.a.	n.a.	DIC44
1968	61	64	24	22	21	20	28	29	5	5	19	19	47	49	H7
1970	64	63	23.5	22.5	15	18	20	23	5	5	18	18	42	28	L53
1971	52	53	16	16.5	-	14	16	14.5	5	4	15	14	55	62	M6
1971	54	57	18	19	12.5	16	17	18	6	4	16	16	n.a.	n.a.	M11
1972	50	51	21	20	-	-	21	19	5	4	17	16.5	34	23	P19
1972	59	61	19.5	25	25.5	21	32	30	6	6	18	18	43	46	P25

U8 right antler abnormal; * P46 healed damage part way up right tine; P36 mal. = malformed; n.a. not available

tip-to-tip distance for which a rigid Perspex rule was used. In a few cases these two measurements could not be made because of damage to the skull.

Most antlers were clean of velvet but F7 (Figure 14) was ready to clean and U2 (Figure 15) was almost clean with hard pointed tines. P36 (Figure 6) had a malformation of the right brow tine probably caused by accidental damage during its early period of growth. DIC 161 was shot because the left antler was hanging after the pedicle was broken in an accident. U8 (Figure 23) had a normal left antler, clean of velvet, but the right was abnormal, apparently because of fracturing of the pedicle in an accident.

Results

Only two intact first heads were available. Each had the characteristic simple spikes, without coronet, which were respectively 21 cm and 23 cm, and 31 cm and 32 cm long. Data for the later heads are reported in Table 1. No means are given for the measurements as the sample size for each age class is small.

All second head antlers had a trez tine as is normal for second and subsequent heads but the variation in the bez tines is apparent, i.e. being present on both antlers, or unilaterally, or totally absent.

The measurements in conjunction with the figures show substantial variations. For example, L26 (Figure 4) and M6 (Figure 10) were born in the same year, but L26's second head measurements all exceeded M6's third head, except internal span and tip-to-tip. P19 and P25 (Figure 11) were born in the same year and both died carrying the third set of antlers, exemplifying variation in overall shape, one V, the other U.

Trends for increasing lengths of the whole antler, the brow tines and the trez tines, and the width of the internal span, can be seen but are not good indicators of age, there being overlap among different ages. By the fifth and all later heads the antler lengths were from 80 cm upwards and internal spans from 60 cm upwards but tip-to-tip was very variable depending on the curvature of the beams.

Discussion

The old myth that one can tell the age of a stag by the number of tines is hopefully dead and buried. Visitors observing deer often wonder about the age of stags, but unless one has marked, known-age animals there is no certainty. Body mass and conformation give a clue as to whether the animal is young, in his prime or old but not an accurate assessment. The antlers of the Richmond stags conform to the generalized pattern of change with age over successive years as illustrated by de Nahlik (1974) but the data presented here indicate some of the variations within each age class in one park. The advantage of such an enclosed population is the absence of immigration or emigration or genetic changes as uncontrolled variables. While qualitatively illustrative of what would be expected in other habitats, quantitatively the data are obviously not transferrable.

To estimate the age of a dead deer from this population its teeth could be examined: some of the stags discussed here were part of an earlier study (Brown and Chapman 1991).

Acknowledgements

Two successive Superintendents of Richmond Park and their staff were very supportive of our studies. Special thanks are also extended to the friends, especially John K. Fawcett and his family, who assisted in the searching for newly born calves, and I am indebted to John for valuable comments on a draft of this note.

I am grateful to Judith Wakelam for taking the photographs for which she holds the copyright.

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FIGURE 1. Stag no. 223, born 1969, second head of antlers. The year tag had been lost but his individual tags, not seen in this view, determined his identity. His antlers were not received after his death.

Photo: Diane Hughes

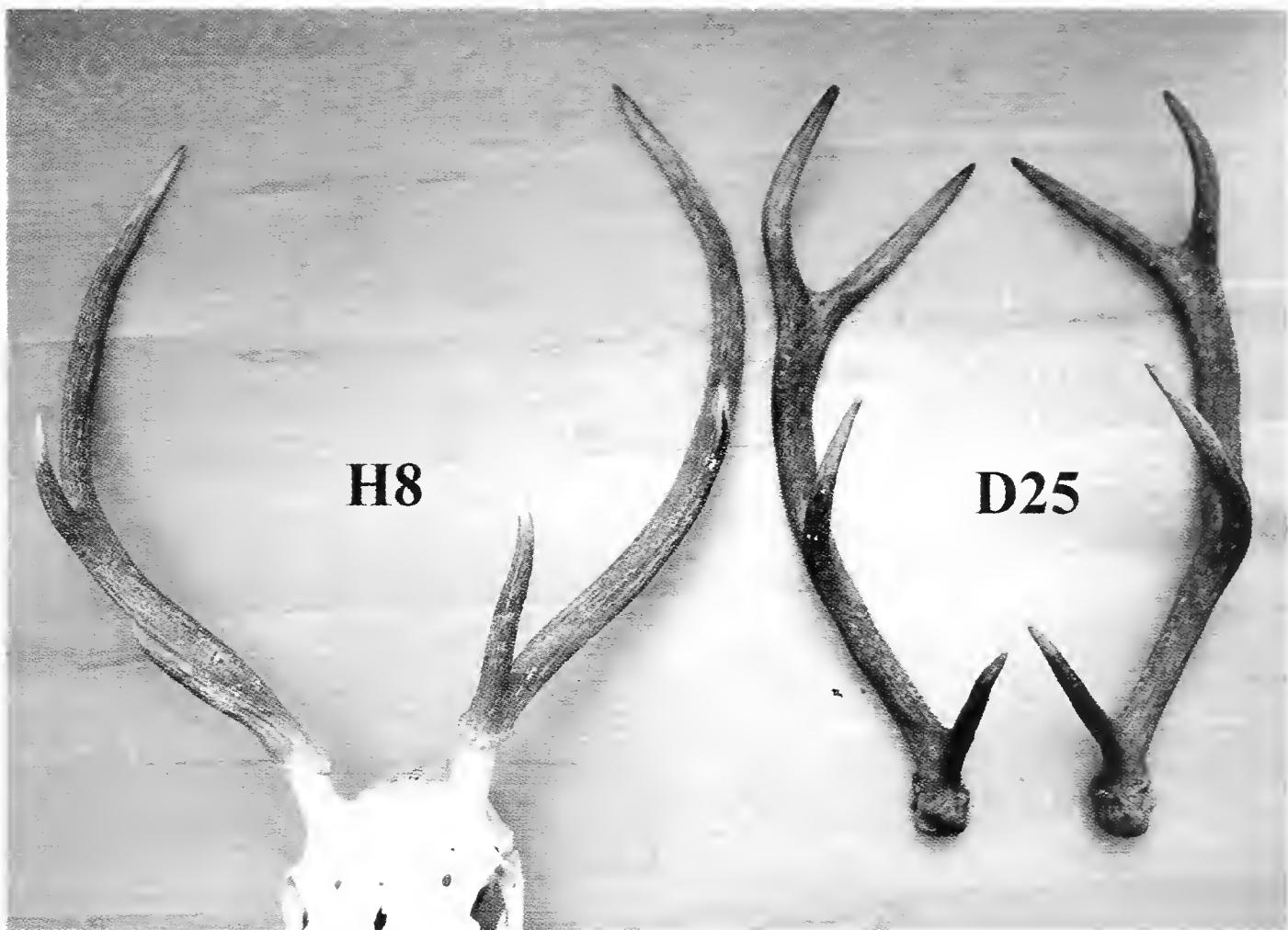


FIGURE 2. Second heads, H8 born in 1968, D25 born in 1967.



FIGURE 3. DIC161, second head, born in 1969.

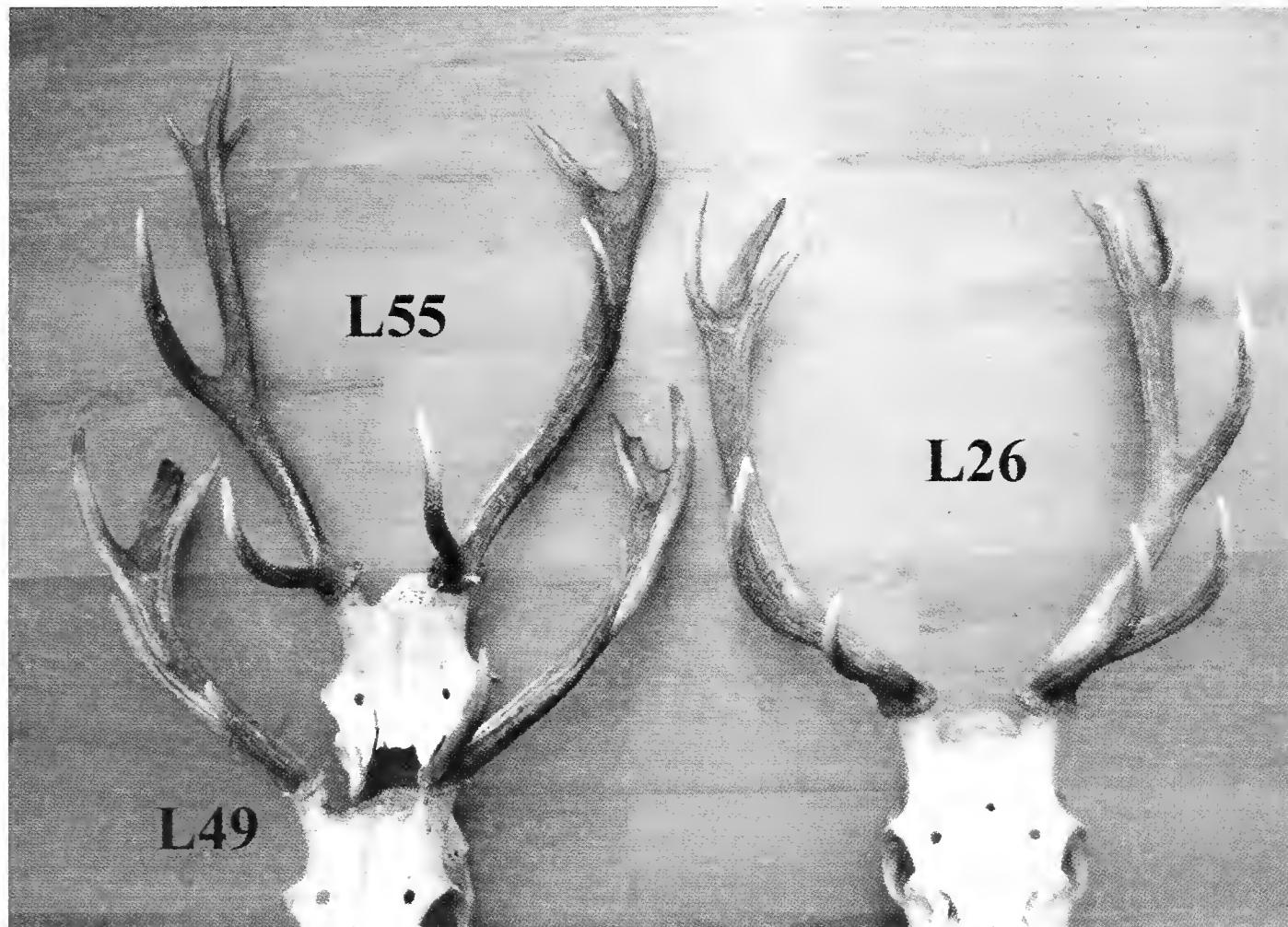


FIGURE 4. Second heads, L49, L26, L55. All were born in 1971.



FIGURE 5. Second heads, M2, M9, M21. All were born in 1972.

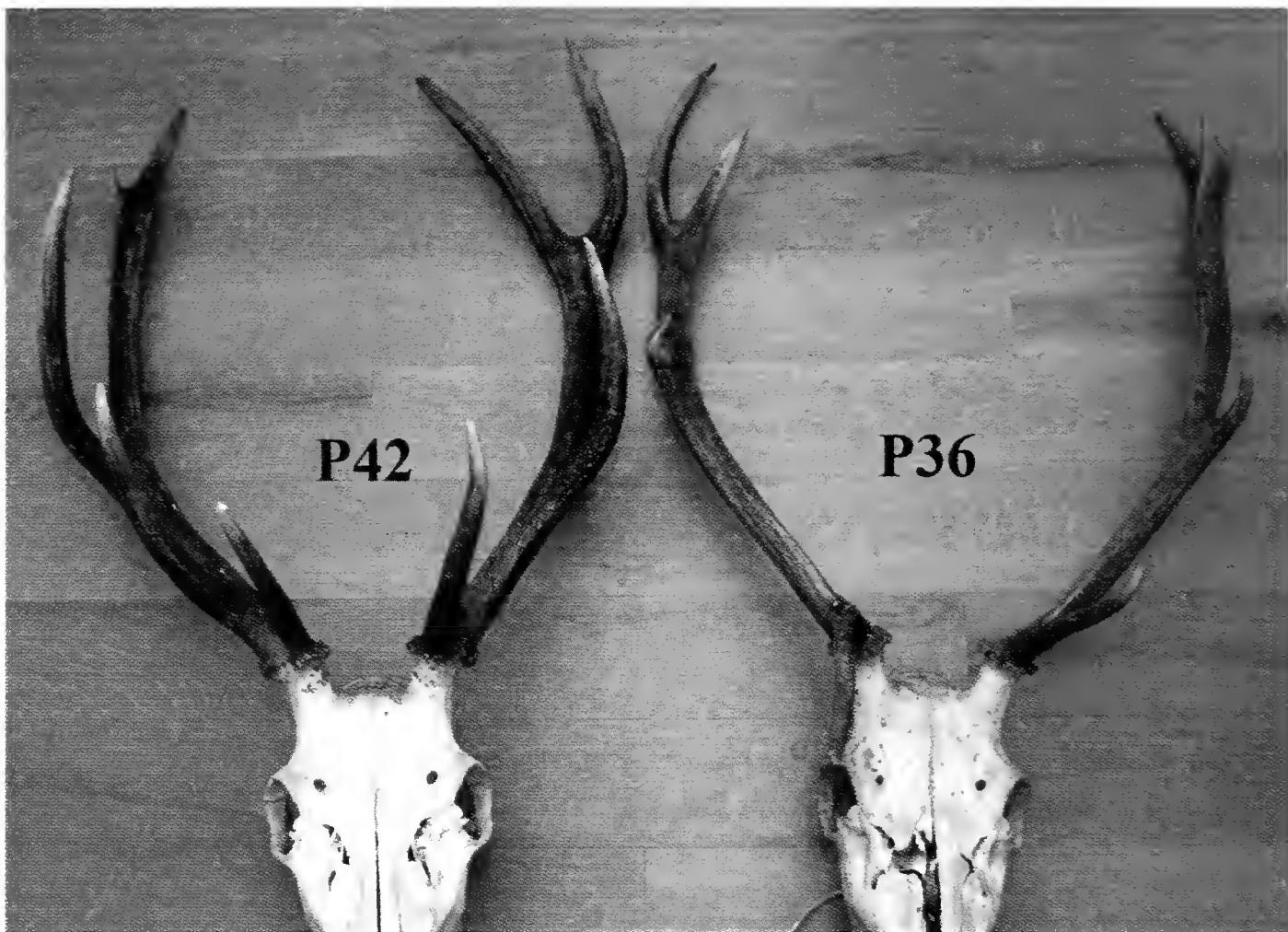


FIGURE 6. Second heads, P36, P42. Both were born in 1973.



FIGURE 7. Second head, R1. Born in 1974.

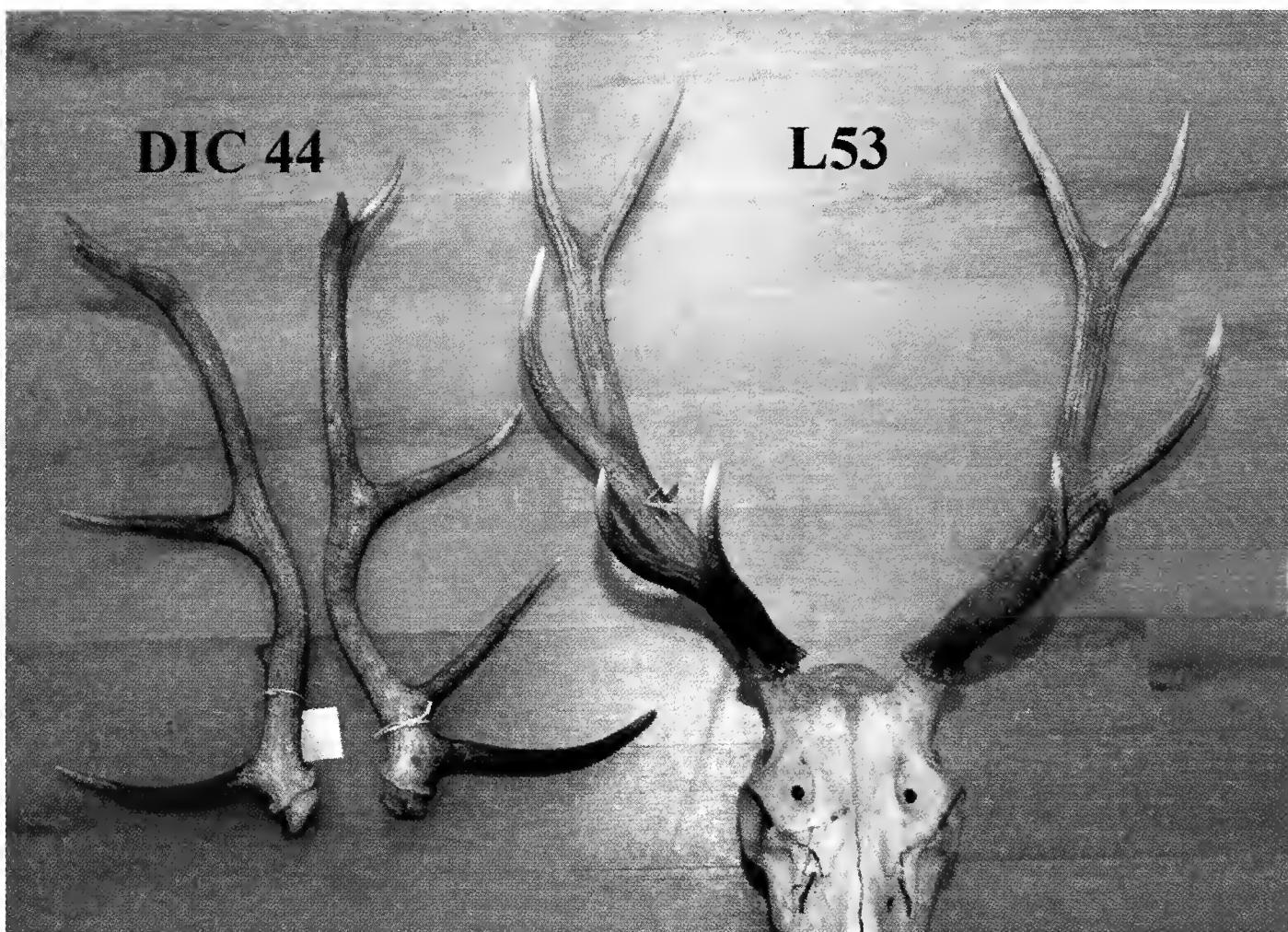


FIGURE 8. Third heads, DIC 44 born in 1965; L53 born in 1970.



FIGURE 9. Third head, H7, born in 1968.

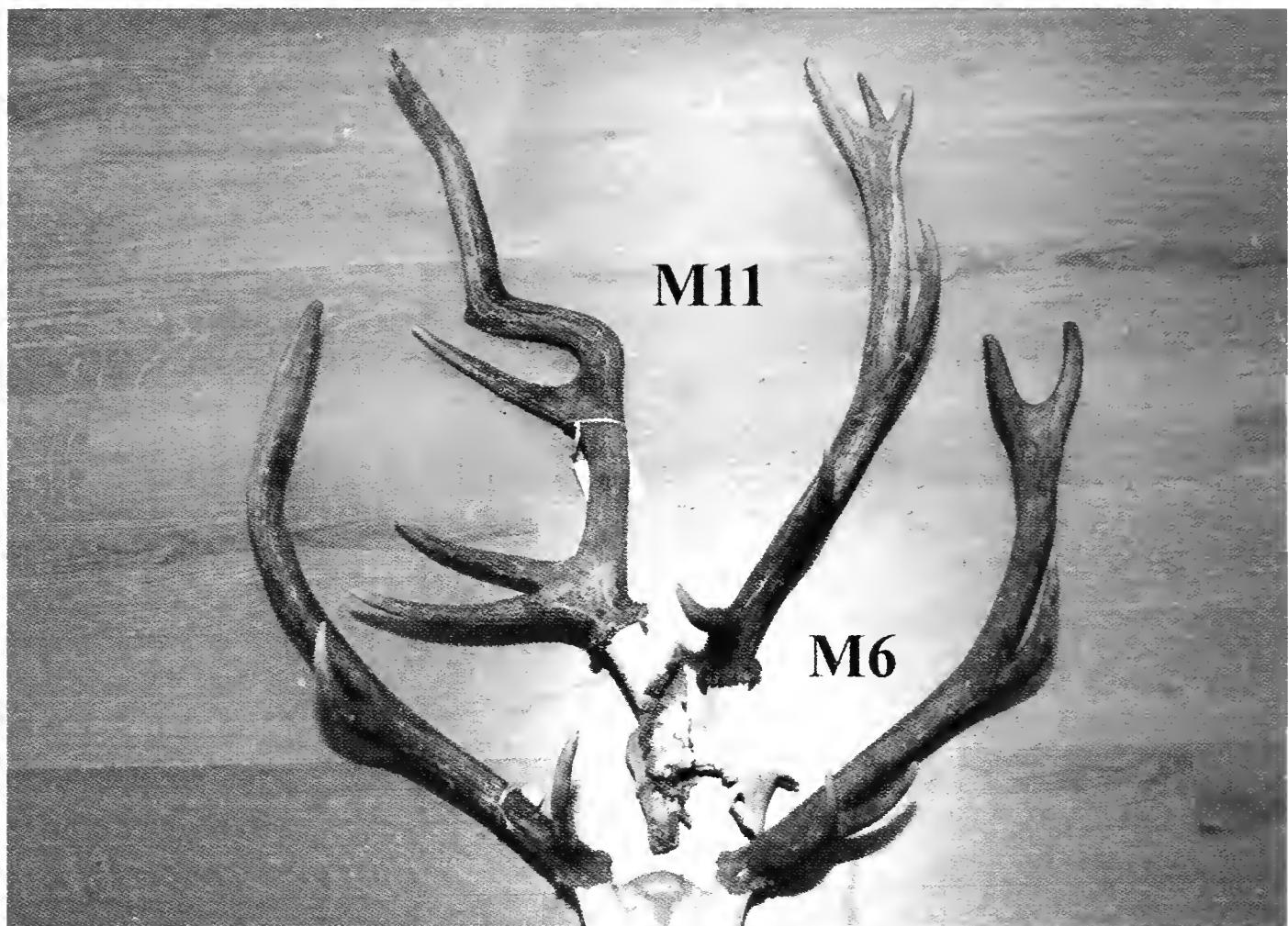


FIGURE 10. Third heads, M6, M11. Both were born in 1971.

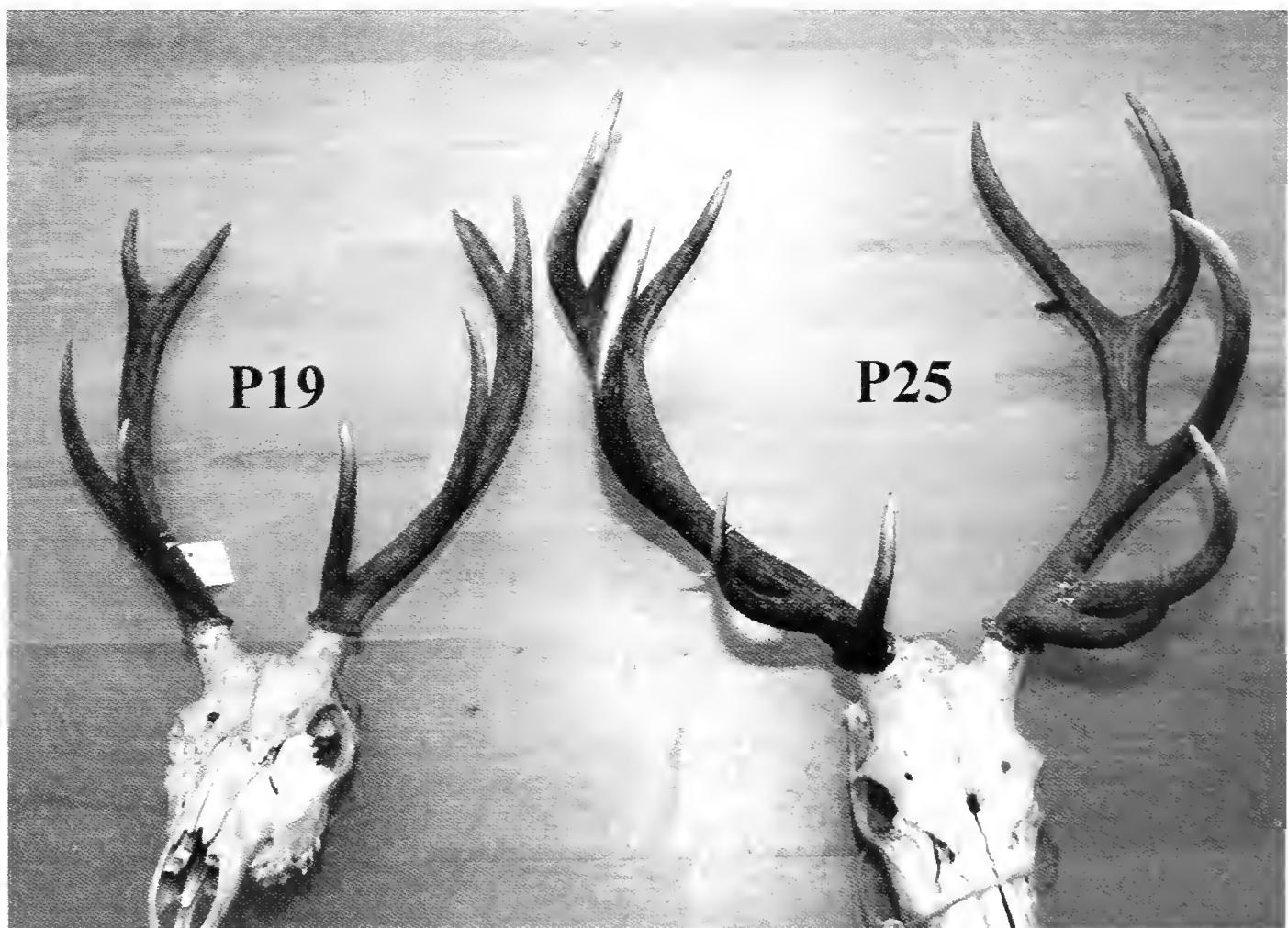


FIGURE 11. Third heads, P19, P25. Both were born in 1972.



FIGURE 12. Third head, P46, born in 1972.

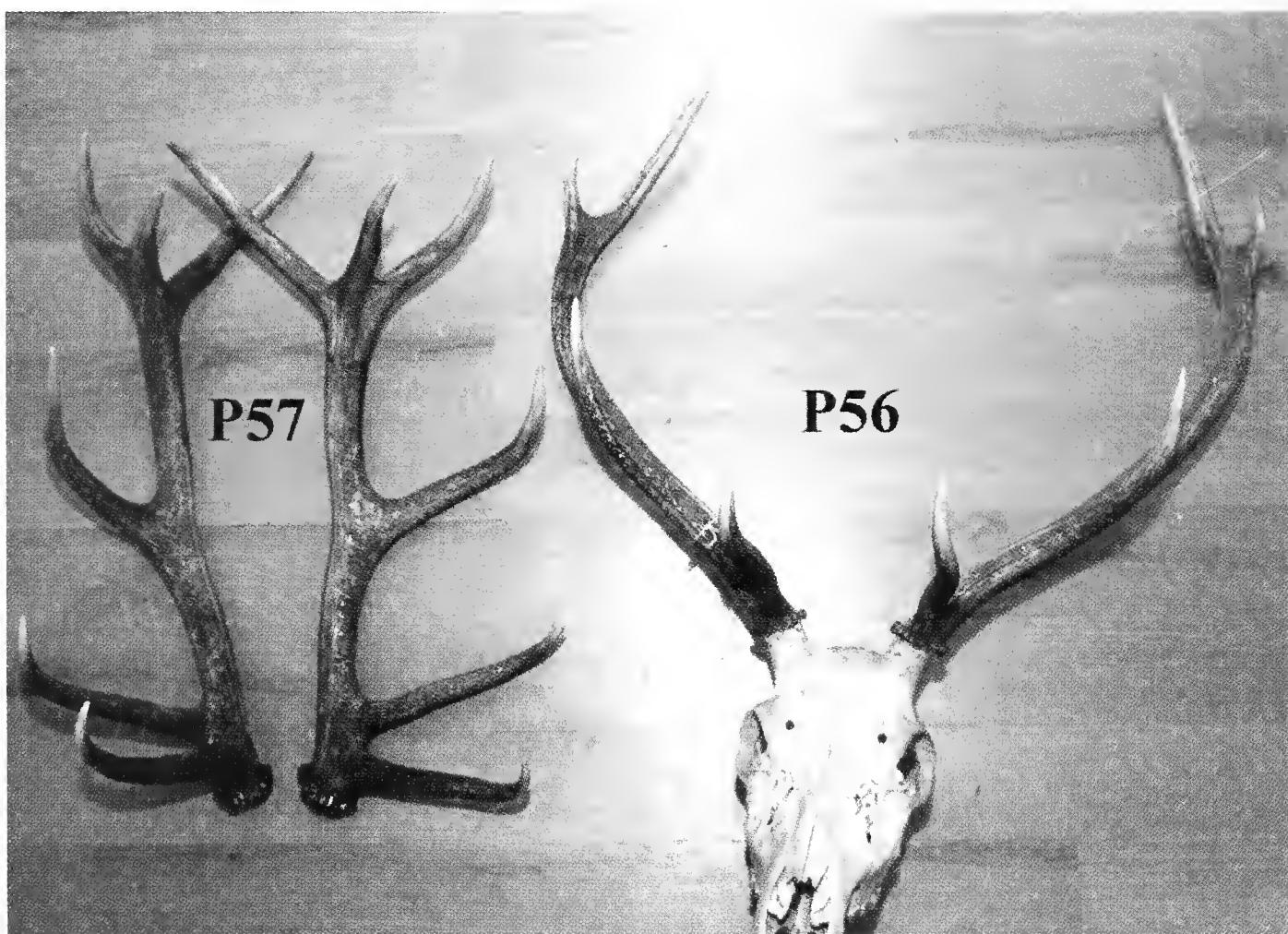


FIGURE 13. Third heads, P56, P57. Both were born in 1972.



FIGURE 14. Fourth head, F7, born in 1966.



FIGURE 15. Fourth head, U2, born in 1975.



FIGURE 16. Fourth head, U17, born in 1975.



FIGURE 17. Fifth head, L60, born in 1968.



FIGURE 18. Fifth head, L61, born in 1968.



FIGURE 19. Fifth head, L24, born in 1973.



FIGURE 20. Fifth head, U11, born in 1974.



FIGURE 21. Fifth head, U26, born in 1974.

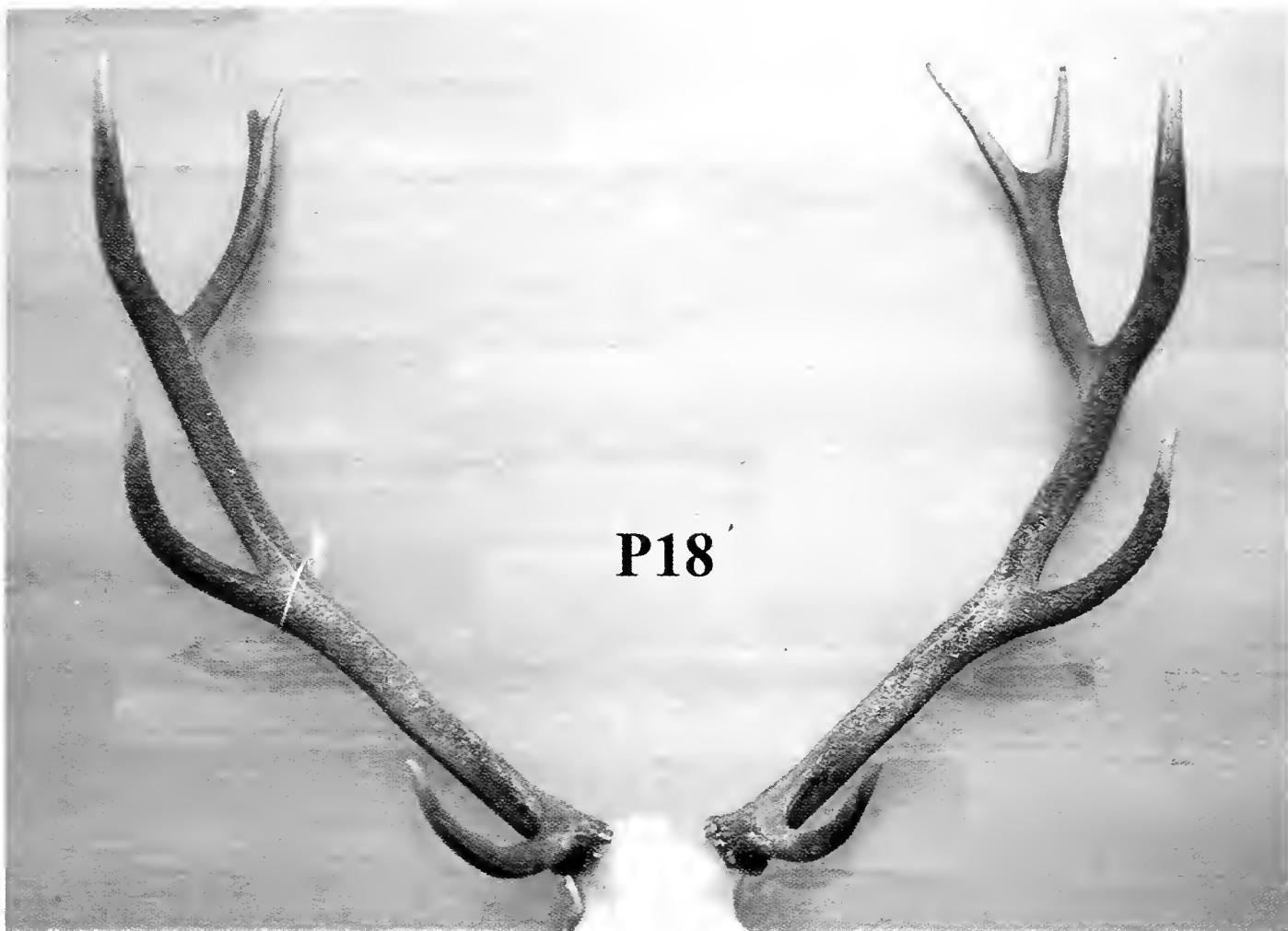


FIGURE 22. Sixth head, P18, born in 1969.



FIGURE 23. Seventh head, U8, born in 1972.

Hedgerow restoration — loss, survival and recruitment of trees at Fryent Country Park

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Abstract

Rates of survival, loss and recruitment of hedgerow trees, the larger trees rising above the hedgerow shrub canopy, were estimated using data from a restoration project at Fryent Country Park, London Borough of Brent, between 1983 and 2013. While losses exceeded recruitment during the first ten years, recruitment of trees exceeded losses during the second and third decades. Known reasons for losses are listed. Recruitment was mainly through the promotion of trees that arose by natural regeneration, but also of trees that had been planted. Rates of survival were similar to those estimated in a national survey. While the national study modelled rates of recruitment, the Fryent study documented actual recruitment and net gains. Data are tabulated for pedunculate oak *Quercus robur* and ash *Fraxinus excelsior*; and for the loss and net changes of hedgerow trees per kilometre. The project also restored 4.8 km of hedgerow length.

Introduction

Results of surveys in Great Britain (Carey et al. 2008) identified a net loss, and at current rates a probable continuing decline, of the length of hedgerows and of the number of hedgerow trees. Hedgerow trees are the larger trees that grow above the height of the shrub component of the hedgerow and are often of a size suitable for use as timber. Hedgerow trees have value for biodiversity and as components of the landscape.

Hedgerow restoration at Fryent Country Park has been guided by old maps, and for the east of the park by a map of Kingsbury parish produced by All Souls College, Oxford (All Souls College 1597), the then freehold owner of much of the land in the parish. Surveys of hedgerows at Fryent Country Park, London Borough of Brent, commenced in 1983 (Williams and Cunnington 1985) which coincided with the start of hedgerow restoration. Surveys have been undertaken at ten-year intervals (see Williams 1994 and 2004) and a further survey was undertaken in 2013. Restoration focused on hedgerows that had been lost due to agricultural and other changes; and improving the habitat of surviving hedgerows. One aspect was to encourage the number of hedgerow trees to improve the structural diversity of hedgerows in the landscape. This paper reports on the rates of loss, survival, recruitment and of the net change of hedgerow trees. Details of changes in the length of restored hedgerows are also presented.

Hedgerow trees are defined, as in the earlier surveys, as trees that rise well above the shrub canopy of the hedgerow and are usually of a size suitable for use as timber. Definitions and terminology vary in the literature, for example



FIGURE 1. A recently restored hedgerow at Fryent Country Park in the foreground and with hedgerow trees arising from hedgerows in the distance. *Photo: Leslie Williams*

they have been referred to as 'standards' as analogous to the coppice with standards of woodland management. The Hedgerow Survey Handbook (DEFRA 2007) used the term 'isolated hedgerow trees' defined as those with canopies that do not touch those of other trees, having a clear stem, being twice the average height of the hedgerow, or being obvious as individuals that have clearly been favoured as single trees by management of hedgerows, while 'veteran trees' were identified as older, generally larger, trees. DEFRA (2009) used the term 'hedgerow trees' which is the term adopted here but the results here do not include two smaller size classes of trees of less than 20 cm diameter at 1.3 m height.

Methods

Lengths of hedgerow, estimates of average width, and the number and species of hedgerow trees were recorded in 2013 as in the earlier surveys of 1983, 1993 and 2003. Lengths of hedgerows, and an estimate of the width of the shrubby component of hedgerows were measured using a GIS (geographic information system) of 2013 aerial images. Widths of hedgerows are more susceptible to errors; and the average was taken from several measurements along the length of a hedge.

The length of each hedgerow was walked to determine the number and species of live hedgerow trees, defined using the same criteria as in the earlier surveys.

Fryent Country Park is a 108-hectare area of the former Middlesex countryside, surrounded by suburbia in the London Borough of Brent. The centre of the park is approximately 2 km north of Wembley Stadium, and approximately 15 km north-west of central London. The park is bisected by the A4140 Fryent Way road. The Country Park includes woodland, hay meadow, acid grassland and pond habitats. The park is almost entirely on London Clay, though with pebble gravel capping Barn Hill. The hedgerows of Masons Field, an extension of the Country Park, were reported separately, so that the main results enable like-for-like comparisons of the original survey area.

Results

Changes in the length of hedgerow at Fryent Country Park from 1983 are summarized in Table 1, together with estimations for the hedgerow length in earlier periods based on aerial photographs. Between 2003 and 2013, the total length of hedgerow increased by 990 metres. The total increase since 1983 was 4,867 metres.

TABLE 1. Total length of hedgerow at Fryent Country Park from 1961 to 2013. Figures for 1961 and 1974 are estimates from aerial images, while those of 1983 to 2013 are from survey results.

Year	c.1961	c.1974	1983	1993	2003	2013
Hedgerow length (m)	8,659	5,905	7,951	10,172	11,828	12,818

The total area of hedgerow habitat was estimated at 10.1 hectares in 2013. This was an increase of 4.5 hectares compared with 1983 when the area of hedgerow was estimated at 5.6 hectares.

The total number of standard trees in the hedgerows at Fryent Country Park in 2013 was 358. The majority, 254, were pedunculate oak *Quercus robur*; 80

were of ash *Fraxinus excelsior*, and there were 7 field maple *Acer campestre*, 3 hornbeam *Carpinus betulus*, 3 grey poplar *Populus × canescens*, 2 Lombardy poplar *Populus nigra 'Italica'*, 2 Norway maple *Acer platanoides*, and one each of pear *Pyrus* sp., apple *Malus* sp., wild service tree *Sorbus torminalis*, Italian alder *Alnus cordata*, black Italian poplar *Populus × canadensis*, crack willow *Salix fragilis* and sycamore *Acer pseudoplatanus*.

Since 1983, 37 hedgerow trees were lost at Fryent Country Park, while 106 were recruited, to give a net gain of 69 trees (Table 2). Between 1983 and 1993 the net change in the number of standard trees was of a net loss of 16 trees (18 lost, 2 recruited); between 1993 and 2003 a net gain of 12 trees (7 lost, 19 recruited); and between 2003 and 2013 a net gain of 73 trees (12 lost, 85 recruited). The highest gains and highest net gain were during the most recent decade; and probably consisted mainly of younger trees that were established or planted in the early to mid 1980s.

TABLE 2. Loss, survival, and recruitment of hedgerow trees at Fryent Country Park, Middlesex, 1983 to 2013.

All species	1983–1993	1993–2003	2003–2013	Period: 1983–2013
Number of all hedgerow trees at the end of time period (1983 = 289 trees).	273	285	358	358
Losses	18	7	12	37
Survival rate per year (average)	99.38%	99.74%	99.58%	99.58%
Number of new hedgerow trees recruited	2	19	85	106
Recruitment rate per year (average)	0.07%	0.7%	2.98%	1.21%
Net survival and recruitment	99.45%	100.44%	102.56%	100.79%

Of the total of 37 trees lost, age-related loss through disease, stress, and physical damage are possible contributory factors. Several trees were possibly lost in the storm of October 1987 though there is only one definite record. Two trees were lost in the lesser storm of 27–28 October 2013.

Four trees (three oaks and one field maple) were lost to unauthorized waste tipping and fire, while two oaks were lost to vandalism and fire. One ash was removed from the boundary of a residential garden. Note however, that in the decade preceding the start of the hedgerow restoration, from 1974 to 1983, an estimated 126 standard trees were lost with approximately 114 of those due to the effect of Dutch elm disease on English elm *Ulmus procera*. Gains of other species during that decade were probably low.

Pedunculate oak and ash were the most numerous hedgerow trees and data on the changes in the numbers of those species are presented in Tables 3 and 4. Numbers for all other species were too low for detailed analysis, with 16 trees of all other species in 1983 rising to 24 in 2013. Collectively they appeared to exhibit more variability in losses and recruitment than for oak and ash.

The gain of hedgerow trees between 1983 and 2013 was of 106 trees. Local knowledge suggested that approximately 28 (26 per cent) were of planted origin while the majority (74 per cent) arose from natural regeneration. Potential hedgerow trees were encouraged by avoidance of cutting; and in some cases by a reduction in completion by clearance of adjacent blackthorn *Prunus spinosa*. A pear *Pyrus* sp. that fell in the storm of 1987, regrew from the stool to the size of a hedgerow tree by 2013. Planted trees included seven that grew from landscaping planted in the 1970s or early 1980s, the trees being of nursery-grown stock, probably in excess of two metres height at the time of planting. One other tree grew from a landscaping scheme of about 1980. Smaller nursery-grown trees of 'whip' size, probably of less than one metre height at the time of planting, had reached the height of hedgerow trees by 2013: these were two pedunculate oak *Quercus robur* planted in about 1986. Other planted trees that reached hedgerow tree size by 2013 were two Lombardy poplars *Populus nigra 'Italica'*.

TABLE 3. Loss, survival, and recruitment of hedgerow pedunculate oak *Quercus robur* trees at Fryent Country Park, Middlesex, 1983 to 2013.

Oak	1983–1993	1993–2003	2003–2013	Period: 1983–2013
Number of all oak trees at the end of time period (1983 = 230 trees).	223	227	254	254
Survival rate per year (average)	99.7%	99.73%	99.47%	99.74%
Recruitment rate per year (average)	0.0%	0.45%	1.41%	0.60%
Net survival and recruitment	99.7%	100.18%	100.88%	100.34%

TABLE 4. Loss, survival, and recruitment of hedgerow ash *Fraxinus excelsior* trees at Fryent Country Park, Middlesex, 1983 to 2013.

Ash	1983–1993	1993–2003	2003–2013	Period: 1983–2013
Number of all ash trees at the end of time period (1983 = 43 trees).	40	45	80	80
Survival rate per year (average)	98.84%	100.00%	99.11%	99.31%
Recruitment rate per year (average)	0.47%	1.25%	8.67%	3.53%
Net survival and recruitment	99.30%	101.25%	107.78%	102.84%

Table 5 restates the data on loss, recruitment and net change based on the length of hedgerow. That provides an illustration of the change at the landscape level. In the final, net change row, a figure of 0.0 would indicate no net change,



FIGURE 2. Oak *Quercus robur* in hedgerow at Fryent Country Park. *Photo: Leslie Williams*



FIGURE 3. Hedgerow landscape at Fryent Country Park.

Photo: Leslie Williams



FIGURE 4. Oak *Quercus robur*, as hedgerow trees.

Photo: Leslie Williams



FIGURE 5. Hedgerow landscape at Fryent Country Park. Black Italian poplar in the distance on Gotfords Hill and an oak *Quercus robur* on the right. *Photo: Leslie Williams*

while a negative figure (as in 1983–1993) indicates a net loss of hedgerow trees, and a positive figure (as in 1993–2003, and 2003–2013) indicates a net gain of hedgerow trees.

Hedgerows at Masons Field, an extension to Fryent Country Park, were not included in the results above. In 2013, the hedgerows of Masons Field, not including the shared boundary hedge in the main survey, totalled 338 metres in length. The hedgerow trees were four pedunculate oak, one ash, one field maple, and one horse chestnut *Aesculus hippocastanum*.

TABLE 5. Number of standard trees per kilometre of hedgerow; with loss, recruitment and net changes annually per kilometre.

	1983	1983–1993	1993–2003	2003–2013	1983–2013
Number of trees per km	36.35	26.84	24.10	27.93	
Number of oak trees per km	28.93	21.92	19.19	19.82	
Number of ash trees per km	5.41	3.93	3.80	6.24	
Number of trees of all other species per km	2.01	0.98	1.10	1.87	
Loss: number of trees of all species lost per km / year		0.18	0.06	0.09	0.10
Gain: number of trees of all species recruited per km / year		0.02	0.16	0.66	0.27
Net change in number of trees lost and recruited per km / year		-0.16	0.10	0.57	0.18

Discussion

Changes in the length of hedgerow habitat have been due to the restoration of hedgerows; and the growth of both the restored and surviving hedgerows. The hedgerow length recorded in 2013 represented the longest in recent times. The shortest length was possibly in about 1968, when a tenant farmer cut the shrub component of many hedgerows to the base, particularly on the east side of the park.

The area of hedgerow habitat is in part proportionate to hedgerow length, and the area was probably also at a relative high in 2013. The average width of

the shrub component of the hedgerows had also increased since 1983, albeit more recently at a slower rate due to containment by mown field edge paths and conservation management. A high proportion of the shrub component of the hedges was of blackthorn *Prunus spinosa*, with growth from both the original shrubs and from their suckers. Where blackthorn had grown outwards until constrained by the mown field edge, the consequence was a reduction of the herbaceous species of the hedgerow edge.

Hedgerow trees appear to have been retained when the shrub component of hedgerows was cut to ground level in about 1968, though it is probable that young trees, which potentially could have grown into hedgerow trees, were probably also removed. In 1974 it was estimated that there were 415 hedgerow trees but all the English elms were lost due to Dutch elm disease by 1983. Hedgerow trees continued to decline in number until about 1993, but had increased to 358 trees in 2013.

Prior to the early 1960s, it could appear that the numbers and turnover of hedgerow trees had been relatively stable during the earlier part of the twentieth century. In the nineteenth and earlier centuries, farmers may have planted, or at least encouraged oak, elm and ash in hedgerows, in the expectation that they would provide timber. As part of a landscape design of about 1793, Humphry Repton planted trees alongside hedgerows on Barn Hill, some of which survive as hedgerow trees.

Nationally, DEFRA (2009) used data from the Countryside Survey datasets of 1998 and 2007 to extract individual tree data for four age-related population size classes; from which to obtain data on mortality, survival and recruitment of new trees. A model was developed and extrapolated to estimate the recruitment rate required to maintain the population of hedgerow trees, in addition to modelling the estimated situation with lower, and higher, recruitment rates. There were differences between the DEFRA study and that at Fryent in terms of methodology and the more sophisticated analysis used by DEFRA. Both studies included hedgerow trees of size classes of 21–50 cm diameter at 1.3 m height (dbh) and of >50 cm dbh, but the DEFRA study also included trees of two smaller size classes of <3 cm dbh and 3–20 cm dbh. The average survival rates of hedgerow trees reported by the two studies were similar; and for the subsets for oak and ash. But whereas the DEFRA study reported that nationally recruitment was not on average keeping up with average mortality, the results from Fryent Country Park demonstrated a higher recruitment rate that enabled a net gain in the population of hedgerow trees.

While the DEFRA (2009) study focused on the rates of change for trees, it could be instructive at the landscape level to consider the losses per kilometre of hedgerow, and the recruitment required to maintain or restore the landscape. The results from Fryent Country Park averaged, over thirty years, estimate a mortality rate of hedgerow trees, of all species, at 0.10 trees per kilometre of hedgerow per year. In comparison, DEFRA (2009) estimated that to replace trees lost annually across an estimated 705,000 km of hedges and relict hedges in Great Britain (Carey et al. 2008) annual recruitment of 30,000 additional trees would be required, which corresponds to 0.043 trees per kilometre of hedgerow per year. At Fryent Country Park the recruitment rate averaged at 0.28 trees per kilometre of hedgerow per year; and the net gain as 0.18 trees per kilometre of hedgerow per year.

These results show that after losses of hedgerow trees, net recruitment could be achieved by a combination of natural regeneration and aided by planting in

restored hedgerows. But potential young trees do need to be encouraged, and protected from cutting as they grow out of the hedgerow shrub canopy.

Acknowledgements

Brent Council is the landowner and manager of Fryent Country Park. Volunteers of Barn Hill Conservation Group have worked on the planting of trees, management of the hedgerows, encouragement of hedgerow trees, and the surveys. Grant aid for some of the restoration was provided by the Countryside Stewardship scheme and more recently by inclusion in Higher Level Stewardship of Environmental Stewardship. At Masons Field, the restoration of hedgerows has been aided by a grant from the Heritage Lottery Fund.

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Life and death of oaks in the Ruislip Woods, Middlesex — then (eighteenth century) and now

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Abstract

Eighteenth-century records show that young oaks were then plentiful in the Ruislip Woods. This is notably different from the present situation with few oak saplings, which appears to be part of the general lack of oak regeneration in ancient woodlands. If this continues, coupled with the current oak tree deaths, oaks will cease to be the dominant tree species.

Introduction

It is easy to assume that the structure of woodland, particularly ancient woodland, remains more or less the same, unless it is interfered with by humans. This is almost certainly not the case. An example of this is the widespread lack of regeneration of oaks in ancient woods. As Mellanby (1968) pointed out, such oak woods seem doomed, when the existing mature oaks died with no young ones to replace them. I report here documentary evidence for the plentiful regeneration in the Ruislip Woods in the eighteenth century and compare it with the health of the current oak population.

Oak regeneration

The lack of oak regeneration in woodland seems to have been first reported almost a hundred years ago (Watt 1919). He put forward several possible reasons for this, such as acorns being eaten; desiccated; and oaklings being attacked by mice and voles. He also noted the disappearance of thousands of seedling oaks within three to four years. Attention to these findings was drawn by Tansley (1939: 291–293) in his classic book on the vegetation of the British Isles. Following experiments on the effects of defoliation, Shaw (1976: 162–181) concluded that there was no apparent failure in acorn production, survival and germination from this. He found that following an acorn crop, large numbers of seedlings could be produced, but that under the canopy of trees such seedlings rarely survive longer than three to five years. It was concluded that defoliation, largely by caterpillars, provided an adequate explanation for this.

A series of experiments on the predation of acorns and oak seedlings by squirrels was reported by Piggott et al. (1991). They pointed out that for grey

squirrels acorns provided a large part of their diet, whereas red squirrels made much less use of the acorn crop. It was shown that grey squirrels were responsible for large losses of acorns of *Quercus robur*. The majority of these were buried in scattered caches. It was found that adults bit out the radicles of acorns before burial, so that all acorns removed by adults were effectively destroyed. Grey squirrels were introduced into Britain at the end of the nineteenth century, which is about the time that the lack of oak regeneration was first reported. However the spread of grey squirrels was slow and coupled with the findings of Piggott et al. reported above, would seem to rule out grey squirrels as the main cause of the current lack of oak regeneration.

Rackham (1980: 295) pointed out that acorns and oaklings had been subject to much research, but it had not satisfactorily solved the problem although '*there can be no doubt that oak regenerated in the past more freely than it does now*'. He termed this phenomenon Oak Change (Rackham 2006: 68) and thought that oak mildew (*Microsphaera alphitoides*), first noted in Britain in 1908, attacking the seedlings was the most plausible reason. This has certain weaknesses, not least that acorns falling or transferred outside the woodland germinate and develop into trees, as Rackham commented, but Watt (1919) had noted that the seedlings may, however, withstand the effects of the fungus if they re-exposed to full light.

Ruislip Woods

The Ruislip Woods comprise four woods in close proximity, namely Park Wood, Copse Wood, Mad Bess Wood and Bayhurst Wood (Figure 1). These are all undoubtedly ancient woodland, apart from two areas briefly cleared in the

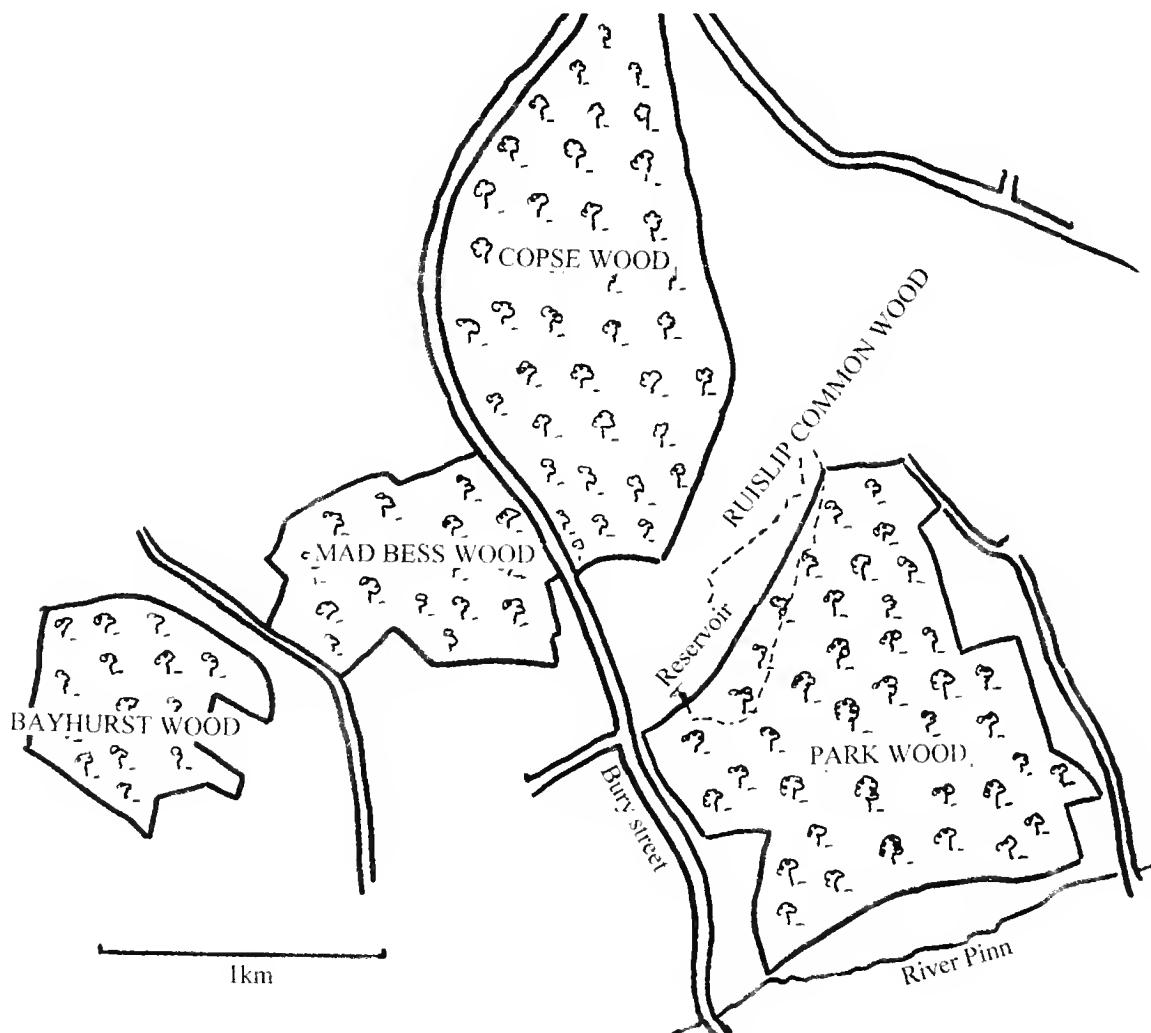


FIGURE 1. Ruislip Woods c.1800. Reservoir (now Ruislip Lido), constructed 1811.

nineteenth century, which have since reverted to secondary woodland. The four woods, together with the grasslands of Poor's Field and Grub Ground, were declared a National Nature Reserve in 1998. In addition, until enclosure in 1814, there existed a large unenclosed area between Park Wood and Copse Wood then called Ruislip Common Wood. At enclosure forty acres of this was set aside for the poor — hence Poor's Field, which remains — but the rest is now largely occupied by Northwood and Haste Hill golf courses. All four woods have large areas of coppiced hornbeam with standard trees, predominantly of oak. Written and visual records indicate that the woods were managed in the traditional manner, with coppiced hornbeam largely supplying the London Market until the nineteen century, and timber trees being used for constructional purposes.

After the woods passed into public ownership in 1932–36 only occasional management work was carried out with the result that the ground flora was much suppressed. Public concern led to Hillingdon Borough Council setting up a Working Party in 1978, which produced a Long-term Management Plan (LTMP), which was adopted and published by the Council in 1982. The main advice of the plan was that the traditional management should be reinstated, where possible. With minor adjustments this has been followed.

During survey work for the LTMP regeneration of trees was noted but no specific, detailed recording was made. The germination and growth into saplings was not critically examined until 1992 following public protest over felling of oak trees as reported by Bowlt and Hawksworth (1993). It quickly became apparent that oak regeneration within the Ruislip Woods was very sparse with large areas containing practically no young oaks, although other tree species were regenerating plentifully. This finding, and the additional concern over dead and dying mature oaks, led to a temporary moratorium on felling of oaks. Subsequent searching found only a few scattered saplings mostly on paths and rides. Non-regeneration does not appear to be related to the effects of coppicing. When oaklings have appeared in such areas they have disappeared within two years.

Historical data

Park Wood and Copse Wood were owned by King's College, Cambridge, as lords of the Manor of Ruislip from 1451 until the 1930s. The King's College archives contain a number of papers (RUI/51 and RUI/399) relating to the cutting of oaks in Park Wood and Copse Wood in the eighteenth century. They principally list the numbers of trees cut by named individual men, the month when cut and the volume of material. These lists were made by Edward Powell, of Uxbridge, who was apparently acting as overseer of the work on behalf of the College. A typical entry is:

'The Account of the Trees that is standing in Ryslip Copps In the Year 1748 And what Number of Trees in Every Mans Work'

1st Work is John Lubb 40 trees; 123 feet (271 small trees)

2nd Work is Tho. Balder 42 trees; 128 feet (279 small trees)

3rd Work is John Webb 55 trees; 177 feet (304 small trees)

4th Work . . .

24th Work . . .

The volumes in feet refer to Hoppus measure (as opposed to cubic feet). Hoppus feet were calculated from one-quarter-girth squared times the length. This is the volume of the squared logs, but with rounded corners. One cubic foot = 0.028 cubic metre.

Elsewhere it is stated that the recorded small trees were those marked as not for cutting. A letter dated 18 March 1745 to the College Bursar from Mr Powell says '*The underwood that is felled and that which is to be felled will be about 30 Acres which will be all felled...?*' The significant point for this and other years is that the cutting was carried out in the spring. The rising sap facilitated the easy stripping of the oak bark. The correspondence contains several references to bark and this was clearly the reason for the spring cutting. Oak bark was in demand for tanning leather until the middle of the nineteenth century when it was superseded by chemical methods. Table 1 is a summary of the data during the period 1721 – 1759 (for some years data are missing).

TABLE 1. Summary of the available data on cutting oaks, 1746–1759 (some years missing). PW = Park Wood; Copse = Copse Wood; CW = Common Wood.

Year	Month	Wood	Works	Trees	Vol.(feet)	Marked	Av. Vol./tree (feet)
1746	April	PW	12	242	—	—	—
1747	?	PW	12	255	963	2,999	3.78
1747	April	?	12	324	1,123	—	3.471
1748	?	Copse	24	1,157	4,123	6,391	3.56
1748	April	CW	24	905	3,452	—	3.81
1749	April	CW	24	699	3,330	—	4.76
1750	March	CW	23	491	1,666	—	3.39
1751	April	CW	21	500	1,530	—	3.06
1753	?	?	11	389	1,464	3,131	3.76
1754	?	?	11	370	1,469	1,693	3.97
1755	?	?	11	445	1,546	3,193	3.74
1758	?	?	?	762	3,826	3,854	5.02
1759	?	PW	10	638	2,278	2,217	3.57

The calculated mean volumes per tree (Hoppus feet) are also given — when data available. These range between 3.06 and 5.02 ft. For a typical Hoppus volume of 3.5 feet and assuming a length of 20 feet (hardly less) the tree diameter would have been 6.4 inches (16.8 cm). These oaks being cut in the eighteenth century were of no great size (or age).

‘Anomalous’ acorn regeneration

Some years ago I noted (Bowlt and Hawksworth 1993) that in one part of Park Wood dense patches of acorns were germinating. The patches ranged from ~ 1 to 20 square metres or so. They were quite isolated from any surrounding oaklings. Growth nodes indicated that many were up to ten to twelve years old, although they were less than twelve inches high suggesting a Bonsai condition. These were in the highest part of the wood and in the only area occupied by *Quercus petraea*. The oaks elsewhere in the wood are *Q. robur* or hybrids. Subsequent investigation revealed that some older nearby patches had developed into thin, closely spaced saplings up to four to seven metres tall, at which height some were dead or dying, presumably self-thinning (Figure 2).



FIGURE 2. Patch of ‘anomalous’ saplings, Park Wood.

The oaks in Bayhurst Wood are largely *Quercus petraea*. In 2012 large patches of seedlings appeared following a bumper acorn crop in 2011. These had disappeared by the end of 2013. No tall developed patches have been found here. [Note: This year (2014) there has been massive regeneration of oaks, with seedlings of both oak species thick on the ground in all the woods. By July many of the leaves were covered with oak mildew. It remains to be seen whether the seedlings will survive.]

A report quoted by Rackham (1980) dated 1792 on Whittlewood Forest, Northants. includes . . . ‘There are a few Copses . . . where the young Oaks stand, in particular Spots, as thick as possible (too thick even to grow Twenty Years without injuring one another). I am informed these particular Spots are Places where the

Keepers have had skirmishes with poor People, who make a Practice of collecting Acorns to sell, and have cut their Bags, by which many of the Acorns have been trod into the Ground. I suggest these were more likely to have been cases of ‘anomalous’ acorn germination, from *Quercus petraea* oaks.

Milner (2012) recorded dense acorn germination of *Q. robur* in Coldfall Wood following a heavy fall in 2011. He reported that this was an unusual occurrence not seen by his twenty-three years of visiting the wood. There was no mention of isolated patches, and the survival of the seedlings is not reported. When *Q. robur* oaklings have been found in the Ruislip Woods, frequently there have been a few close together, but not outside woods. These have disappeared within a year or two.

Oak tree death

Oak trees almost always have some dead branches which are usually considered a sort of self-pruning. Consequently dead and dying oaks are often not particularly noticed in amongst growing coppice. However, in the Ruislip Woods after coppicing they are rather obvious (Figure 3). Several such examples have suggested that there are more dead and dying oaks than one would expect. No obvious signs of particular diseases have been found.



FIGURE 3. Dead and dying oaks in coppiced area, Copse Wood.

The bulk of the standard oaks within the woods are estimated to be of the order of 150 years old. In earlier times oak trees within a working wood would not usually have been allowed to grow beyond maximum sizes required for constructions — typically twelve inches in diameter for the main posts of buildings. The majority of the standard oaks currently growing in the Ruislip Woods (and in many other old woods) have been allowed to grow larger than this. Consequently, trees which are now dead and dying would have been felled before getting to this state, which would have made it a largely unknown condition within

working woods in earlier times. This is not to say that there is no threat to oaks generally as seen by oaks outside ancient woodland, such as in hedgerows. The loss of plants such as *Sphagnum* moss and the drying out of certain wet areas on Poor's Field and within the woods in the last fifty years indicates a lowering of the water-table. This may be a major contribution to oak mortality.

Discussion

The data from the Ruislip Woods show that in the eighteenth century there were large numbers of young oaks, with some being cut in the spring, largely for their bark, and with the smaller saplings being left standing. It is clear that at this time regeneration of oak was plentiful and widespread. This is a very different situation in the Ruislip Woods at present.

More-recent searching has revealed that there are a few tall scattered saplings, usually along the edges of paths, but these in no way match the numbers recorded in the eighteenth century. The dense 'anomalous' germination of acorns, recorded in two small areas, is patchy and would not produce the hundreds of oaks able to be cut in the eighteenth century.

Heavy falls of acorns were again recorded in all woods in 2013, and attracted large numbers of feeding wood pigeons. Although sprouting acorns were found in spring the following year (2014) dense patches only developed under *Q. petraea*. The reason for this difference is obscure but contrasting physiological behaviour has been noted (Rackham 1980). Clearly in the past acorn germination and development into saplings was much greater than now. If this and the large number of deaths continue, oaks will cease to be a dominant tree species. Their place in the Ruislip Woods could be taken by beech, which was noted to be spreading in Park Wood a few years ago (Bowlt 1991) and continues.

The oak structure of Ruislip Woods has changed since the eighteenth century when there was a continuing supply of young oaks.

Acknowledgements

I wish to thank Richard Hutton, Woodlands Community Officer, London Borough of Hillingdon, for the help he has given in survey work.

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Book review

A year with a rambler in a high place. The flora and fauna at Dunstable Downs and on the Chiltern Hills, 2013–2014. Brian Cusworth. Hemel Hempstead. A Green Woodpecker publication. 2014. 50 pp., A5, spiral bound. £5.99. ISBN 978 0 9522497 2 6.

Brian Cusworth spent time walking in this area, which lies about thirty-five miles north-west of London, after injuring his ankle. He soon began using his mobile phone to photograph the plants and animals (mainly butterflies) which he saw en route. He has now put these photographs together into a short spiral-bound volume to which he has added brief captions, some of the observations which he made on his walks, and sections on the history and geology of the area.

He has clearly enjoyed compiling his book and it is evident that he views the natural environment with both affection and humour. Perhaps his publication might prompt his fellow ramblers to look at the wildlife as they walk and inspire them to take their own photographs of what they see. If he helps to encourage other people to take an interest in the natural world that is undoubtedly a good thing, and it is also good that he is keen to point out the need to take care of the countryside which he loves by emphasizing the importance of not dropping litter, for example, and of obeying the rules on foraging.

He has produced a pleasant little book, which might appeal to some of the many visitors to this attractive area, although it is important to appreciate that it is not aimed at the serious naturalist or at those expecting either a field guide or a comprehensive account of the flora and fauna of Dunstable Downs.

MARIA ROBERTS

Nonsuch Park and adjacent open spaces in Ewell, Surrey — an update twenty years on

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Abstract

This is an update with further species and details of habitat and management changes since the report on Nonsuch Park twenty years ago and published in *The London Naturalist* (Chatfield 1994). More information on the history of the site, the updated geology and various old maps are available as publications and also online. The Friends of Nonsuch have since renovated the service wing of the Mansion House for a museum. Following development threats Warren Farm is now in the hands of The Woodland Trust and the old plant nursery site on London Road incorporated as part of the park. Nonsuch Watch continues to be active with more recollections, field meetings and surveys as well as monitoring development applications, much of which is documented in their *Newsletter*, giving further background to some of the issues.

Introduction

There have been significant changes to the wildlife of Nonsuch Park in the last twenty years, some of them in line with the whole London area, following cleaner air and tree bark now that coal burning and smogs have been brought to an end: it is particularly evident in the increase and abundance of epiphytic species of lichens and bryophytes. Wild flowers and insects have benefited from the introduction of meadow management across the park and the former arable land of Warren Farm has developed into a flower-rich chalk grass community with thousands of pyramidal orchids in flower as well as kidney vetch, yellow

rattle and common broomrape, a rare richness so close to London. Two areas have been saved from development but new planning applications on the periphery continue to give concern for their potential impact on Nonsuch. Some molluscs and insects have expanded their ranges and abundance with additional species recorded. There have been some losses and depletions of populations. Sadly, farmland birds like skylarks continue to decline while the alien parakeets increase in number, but sparrowhawks are back. Some groups not recorded before, like moths, are now included in the report but much still remains to be studied in the future, filling in gaps of groups as well as monitoring change. Balancing the needs of wildlife and quiet green space with the surrounding suburbia and people pressure remains as an issue.

All photographs are by the author unless credited otherwise.

History of Nonsuch

The first volume on the Nonsuch Palace excavation 1958–9 has been published (Biddle 2005) and includes a report on the shells found subfossil during the excavation. The second volume on the architecture and building is in preparation. The sites of the three palace gatehouses are now marked by obelisks along The Avenue between the Ewell Gate and the bend. The excavation concentrated on the north side of the palace, leaving the south side unexcavated for archaeologists of the future; a wise action in view of the advances in archaeological techniques since the 1950s following the early methodology of Sir Mortimer Wheeler. Today the study of animal and plant remains from excavations underpins the new discipline of environmental archaeology. An account of the palace garden was published (Biddle 1999). The Friends of Nonsuch (founded in 1991), associated with the Mansion House and garden in the park, have renovated the service wing and established a fine museum portraying the history of the former palace (often confused with the Mansion House with its 1802 enlargement that presented some visual similarity). Displays include a scale model of the palace, as well as the story of the Mansion House and its occupants and servants until the Nonsuch estate (Little Park), was sold to local authorities and opened to the public in 1937. Visit their website for opening times. Aspects of Nonsuch history are found in some publications issued since 1994 by the Nonsuch and Ewell Antiquarian Society (now called Epsom and Ewell History and Archaeology Society) on sale at Bourne Hall Museum, Ewell and The Friends of Nonsuch museum. The history of Nonsuch, from medieval village and farmland to Royal palace and deer park, back to farmland and gentleman's house and garden and finally to local public ownership with access for recreation since 1937/8, has shaped much of the habitats and species composition of today (Chatfield 2012b). Agricultural use, mostly arable or haymaking, was continued during and after the Second World War years until the 1960s for Nonsuch Park and the 1980s for Warren Farm. The end of agriculture with the whole of Nonsuch now for open space and amenity has had a profound effect on the wildlife detailed in the previous Nonsuch paper (Chatfield 1994) and this reflects much of rural Surrey today.

Veteran trees

The previous report (Chatfield 1994) covered ornamental trees in Cheam Park in an appendix but no report was made on veteran trees within the park. The study and recording of ancient trees is a topic that has gathered much interest in recent years. From the early 1950s I have been aware of two distinctive parkland

oak trees that were particularly old and separate from woodland, and Frank Tait, in his recollections of helping with farming work in his youth, knew one of them as a place for shade and shelter to have lunch during harvest work. This veteran oak *Quercus robur* (Frontispiece) is situated near the Round Pond (TQ/23095 63738) and has a broad canopy showing that it has always grown in an open location. Apart from some rot holes at the base, once filled with concrete, this tree has a healthy head of foliage and is most attractive at different seasons from the shape of the bare branches in winter, through the young bronzy leaves bursting in spring, the heavy green of summer and golden colour in autumn. The second ancient oak (Figures 1 and 2) is on the crest of the slope of London Clay by the driveway from Sparrow Farm Road gate to the Mansion House on a line with the Oak Plantation (TQ/23218 63946). This tree is not in such good health and has for some years been losing branches in gales as well as fungal growth from internal decay and some of the trunk is now devoid of bark, so unprotected. Both of these oaks are recorded by Dr Brian Spooner who joined a Nonsuch Watch field meeting in April 2013 together with a colleague Dick Alder from the Veteran Tree Forum, and they checked on the existing trees listed for Nonsuch as well as adding an ancient sycamore to the list. The Woodland Trust ancient tree website does not show any for Nonsuch.

Sycamore was a fashionable tree to plant in the eighteenth century when Nonsuch was being landscaped as a country house and home park farmland, while in Selborne, east Hampshire, The Revd Gilbert White recorded the planting of a sycamore on the Plestor, or village green, by his brother Thomas White in 1788 (Johnson 1970). In Cherry Orchard Farm, on what was possibly the south-east corner of Nonsuch Palace, is a large sycamore with multiple leaning trunks (Figure 3), having been coppiced at some stage of its early history; this was shown to Brian Spooner and Dick Alder for adding to the veteran tree register. It could well have been the original source of sycamore seed that has now infiltrated nearly all the wooded areas in the park. I have always known sycamore at Nonsuch from the 1940s but my impression is that it has become more widespread and common in the Nonsuch landscape in the last half century and is the dominant tree colonist along the abandoned Cheam to Ewell dual carriageway in the Surrey County Council strip that I remember as open land beside the cereal fields of Warren Farm in the 1950s (Figure 4). It was the change from this to mature secondary sycamore woodland along the old road that Frank Tait (my neighbour in Alton) found so surprising when he revisited Nonsuch in the 1990s. From initial planting as specimen trees sycamore is now a freely self-sown opportunist that is invasive due to its leaf mosaic and efficiency leading to a fast rate of growth, overshadowing and competing with more slowly grown saplings like oak.

There have been some changes to the list of exotic trees in Cheam Park made by Bryan Radcliffe in 1982 (Chatfield 1994) and Jovita Kaunang reports that this needs updating as many of the trees have been lost in storms since that list was made. Cheam Park and Cheam Recreation Ground is the open land that surrounded Cheam House which was destroyed by a bomb in World War II. It is in the London Borough of Sutton and Cheam as the North Plantation perimeter woodland strip of Nonsuch Park marks the boundary of the Surrey Borough of Epsom and Ewell.

Gardens

The old village of Cuddington that preceded the palace of Nonsuch was a long narrow strip parish with a church, St Mary's, and a manor house, but it was



FIGURE 1. Hilltop veteran oak by the Oak Plantation, Nonsuch Park showing a scar from detached limb, 14 September 2009.



FIGURE 2. Hilltop veteran oak five years later showing a large area of the trunk devoid of bark, 31 May 2014.



FIGURE 3. Old coppiced sycamore on the palace site, Cherry Orchard Farm, looking towards Nonsuch Park. An obelisk by The Avenue marks the position of a gatehouse of Nonsuch Place (right).



FIGURE 4. Secondary woodland dominated by sycamore surrounds the abandoned roadway parallel to Warren Farm, Nonsuch Park.

always a small settlement and much decimated by the Black Death in the mid fourteenth century. The Manor House was near the church and had a garden and orchard and the last Lord of the Manor was Richard Codington/Codyngton who was given a new manor in Suffolk from a dissolved priory in compensation (Anon., no date, c.1999). Nothing is known of the gardens or the immediate surrounding landscape other than 'highe and gret tumber trees' (Biddle 2005), but as the village was a declining one gardens would have been limited. Tudor gardens were developed as part of Nonsuch Palace from 1538 with a kitchen garden, formal privy garden and old orchard immediately next to the palace, a wilderness with paths and the Grove of Diana leading from the palace to the banqueting house: a map is shown in Biddle (2005). The Grove of Diana may have been remodelled from worked coppice woodland of the original medieval village of Cuddington and there could be an element of ancient woodland flora preserved in the soil seedbank of this area where dog's mercury is found today.

Henry VIII, in spite of his enthusiasm for the building of the palace to eclipse all others, hence the name 'None Such', made relatively few visits: it was never really completed by the time he died and was probably always a maintenance nightmare from an over-ambitious design. In the later care of the Lumley family, funding would not have been available to maintain elaborate gardens. Post-palace tree planting, when Nonsuch reverted from deer park to farmland on purchase by the Thompson family in 1731, concentrated on the banqueting house mound and the veteran sycamore on the corner of the palace site may have come in at that time. Landscaping continued with the purchase of Nonsuch by the Farmer family in 1799 who held it until the estate was sold to a consortium of local authorities under Surrey County Council in the late 1930s. Gardens were established on a grander and more permanent basis around the Mansion House in Nonsuch Park, especially with the remodelling of the house from the original home farmhouse in 1802, but unlike the Nonsuch Palace it was a family home. The landscaped garden of the Mansion House was well known and was visited by William Gilpin when he was Headmaster of Cheam School (that was moved to Newbury, Berkshire in the 1930s). Gilpin's role in this area is outlined in displays in Whitehall, a museum in Cheam Village, and Percy (2001). With the Mansion House and refreshments a focus for visitors once the park was open to the public, the formal gardens have always been much admired.

The extensive area of garden and pleasure grounds, appropriate to the size of the house, have diverse habitats for the natural world too with garden walls, ancient mossy lawn, old quarry dell for snowdrops, wooden seats (to be colonized by lichens eventually) and at the rear, backing on to The Avenue, an arboretum on damp ground. A detailed survey of the flora and fauna of the garden still needs to be done. To date interesting finds so far are drooping star-of-Bethlehem *Ornithogalum nutans*, townhall clock *Adoxa moschatellina*, spring beauty *Claytonia perfoliata* and goldilocks *Ranunculus auricomus*. The uncommon leafy liverwort *Porella platyphylla* grows on the outside of the flint garden wall by Fir Avenue while on a wooden bench a tiny crust lichen *Cyphelium notarisii* that was the third record for Surrey was found by Frank Dobson on a Nonsuch Watch walk in April 2003 (Chatfield 2003). Further surveys of the fungi of the old lawn are needed by specialist mycologists as this will affect the way the grass can be used and the methods of management to adopt. The gardens will have species not found in the rest of the park and would merit survey visits in the future.

Topography, geology and hydrology

The topography was described earlier (Chatfield 1994) (Figure 5) and contours are shown on Ordnance Survey maps, but since then the new Explorer series (orange covers) has been issued at the larger 1:25,000 scale (Sheet 161 London South) and also updated in content. The varied topography of Nonsuch gives greater landscape and biodiversity interest with slope and aspect coming in as important ecological factors, such as the south-facing Sleepy Field at Warren Farm and the field around the banqueting house that are especially rich in insects from a warmer sheltered microclimate. In contrast some of the south London commons are completely flat.

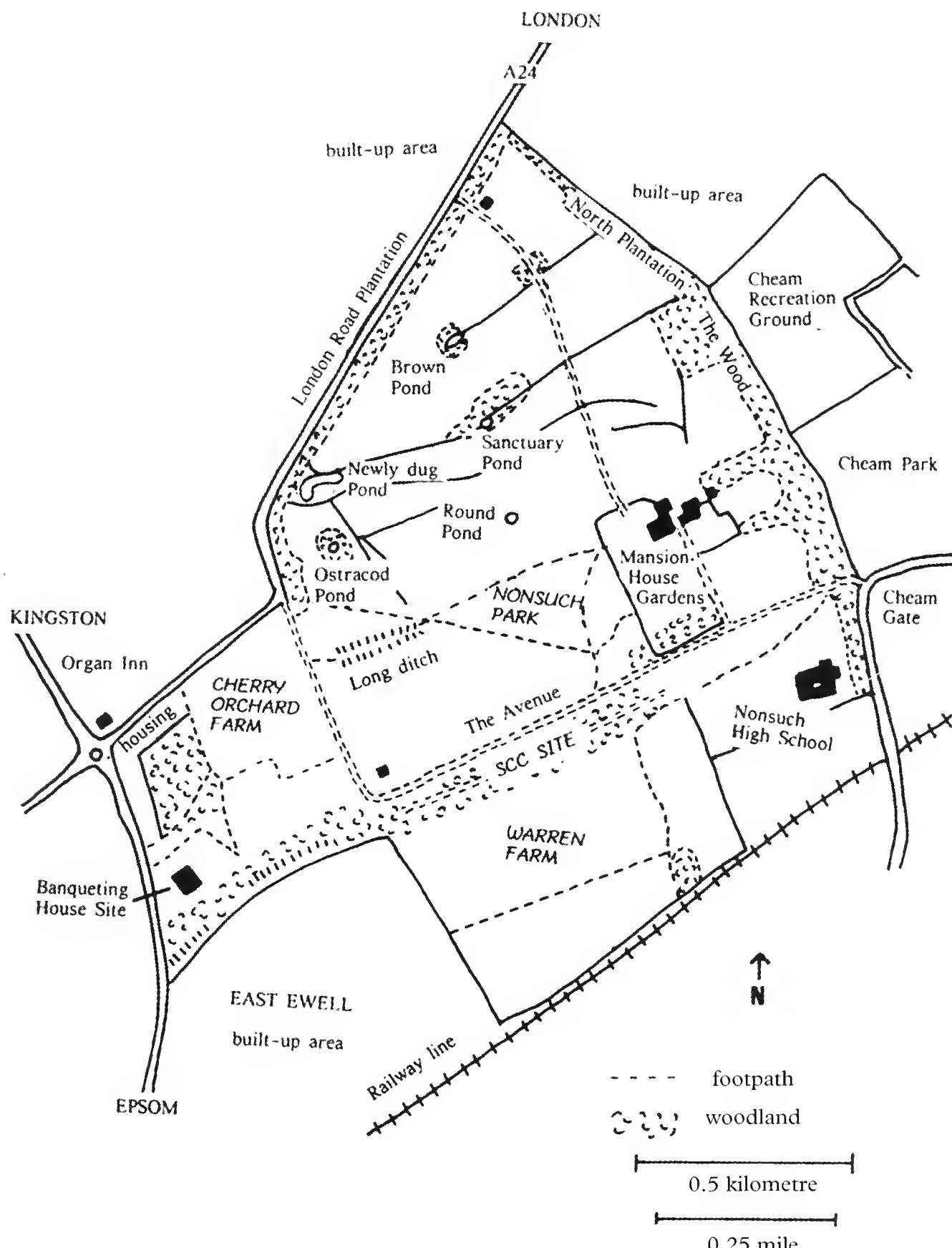


FIGURE 5. Map of Nonsuch Park from Chatfield (1994).

There has been further geological surveying in 1992–5 with a new geology map (Sheet 270 South London) published in 1998. The British Geological Survey website (www.bgs.ac.uk) now provides local geology online. This shows additional information for Nonsuch compared with the older edition of the geology map for Nonsuch used in 1994 (Figure 6). Chalk head deposits have been identified and mapped with bands outcropping through the grounds of Nonsuch High School and along the valley of Warren Farm to spill out into Nonsuch Park overlaying the Thanet Sand and connecting with the valley at the foot of the London Clay: this is the main drainage basin through the middle of the park to the Ewell Gate area where a stream ran in earlier times. The deposition of chalk head over bedrock can be seen as a slight change of surface profile when looking east from a seat in Round Pond Field. This helps us to unravel the post-glacial and drainage history of Nonsuch. Whilst this area was not under glaciers during the Ice Ages of the Pleistocene period from two million years ago, it was still very cold, water in the soil was frozen (permafrost) and locked into the system rather than being able to follow the hydrological cycle. As the last Ice Age came to an end, which is now thought to have been a comparatively rapid event, there was a considerable amount of meltwater from the thawing of ice and very rapid discharge down slopes, by

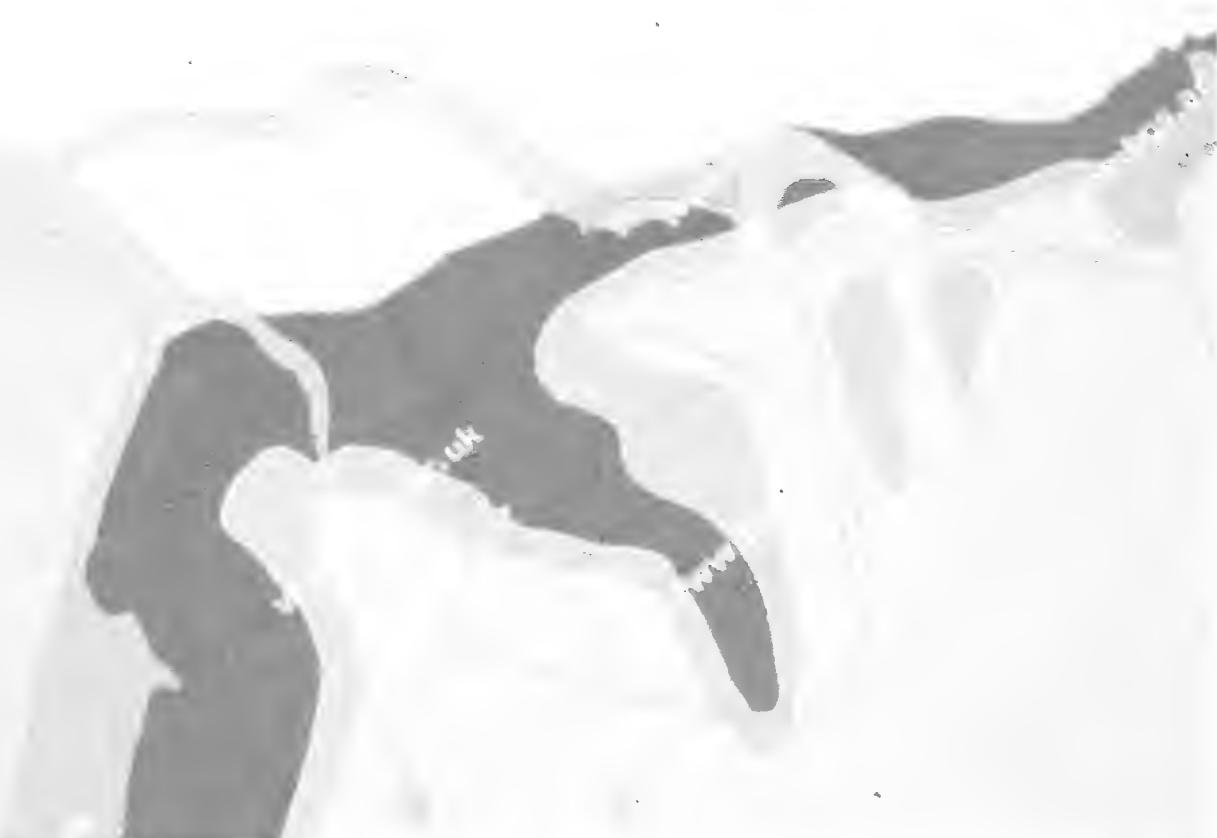


FIGURE 6. Geology of Nonsuch from the British Geological Survey website. Key – green, chalk; blue, Thanet Sand; tan, Lambeth Formation; lilac (top), London Clay; pink, Head; yellow, alluvium.

Chalk

London Clay

Thanet Sand

Head

Lambeth Formation

Alluvium

stream water cutting valleys along with friction from frost-fractured lumps of chalk, pulverized chalk flour and soil that would have progressed west along the valley in Warren Farm to enter the stream at the foot of the London Clay in Nonsuch Park, then flowing south and through the area that is now Stoneleigh to join the Hogsmill River. As the deluge from ice melting slowed down, so the solid matter was dropped on the bottom forming the chalk rubble or head or coombe rock deposited in the dry valleys of the chalk.

The valley stream through Nonsuch Park continued to flow after the thaw and built up alluvial silt deposits along its course shown in yellow on the geology map. The Nonsuch valley is therefore a natural drainage channel, and one of the early maps of the park (Dent 1981) shows a 'Great Pond' in the vicinity of the Ewell gate (Figure 7): here the Balancing Pond was dug in the mid 1980s to store surface runoff and prevent flooding of the road. The line of the former stream was also exploited for ditches to drain the land when, after the deer park, it was returned to farming. Local legend has maintained an underground stream in Nonsuch that rises every seven years. A recent paper on the Hogsmill River (Exwood 1997) shows a dotted tributary on the map (indicating that it was not continually running) that arises in Nonsuch Park and traverses Stoneleigh to enter the Ewell Court Pond draining into the Hogsmill River. Exwood found that it was called the Earthbourne, an intermittent stream, and was last photographed flowing in Nonsuch Park in the 1920s. The presence of this tributary of the Hogsmill from Nonsuch Park is confirmed in an Ordnance Survey map *c.*1800 (Cassini Historical Maps, West London, 176) that shows a stream running part way in the west end of the park connecting with Ewell Court and thence to the Hogsmill River, reflected in river alluvium of the geology map.

Groundwater is also part of the Nonsuch geology. Springs from the chalk arising in Conduit Field on Warren Farm were used to supply Nonsuch Palace while the Round Pond is likely to be due to impeded drainage from underlying Bullhead Beds of flint. A twentieth-century borehole for water abstraction by Sutton Water Company situated in Nonsuch Park exploits an aquifer deeper in the chalk strata to supply the water-hungry surrounding urban area and this has its own Environment Agency groundwater protection zone. Exwood examined the hydrology of the Hogsmill catchment considering rainfall, water abstraction and changes in sewage outfall (now at Kingston) that has long been depriving the Hogsmill River in Ewell of water. Local changes in soil moisture and soil chemistry are important factors in the distribution of plants and animals at Nonsuch.

A good sequence of rocks outcrop at Nonsuch and it was selected as a venue for the field visit in a course 'Geology of the London area' run by the South London Botanical Institute (SLBI) in 2012. This group was already familiar with Nonsuch from previous botanical excursions. Upper Chalk can be seen exposed in the side of the dry valley at Warren Farm and Head deposit also by following the path up towards East Ewell. On the surface on high ground near the new houses off Seymour Avenue are small dark rounded pebbles probably eroded out of the Blackheath Beds, and occasional large bullhead flints that mark the uneven eroded surface of the Chalk Formation of the Cretaceous period. The fields between The Avenue and the Round Pond are of a sandy nature due to Thanet Sand, the oldest outcrop from the Tertiary Era often exposed in molehills, and this is slightly acidic (pH 6.5). Strips of Thanet Sand overlie the chalk at Warren Farm but boundaries are obscured through past

ploughing. The path through the pottery woods at Cherry Orchard Farm shows exposures of brown-red mottled clay of Reading Beds, part of the Lambeth Formation, and in the past it was worked for clay, hence the terrain and the former Bluegates Pond. The mottled clay is further exposed in a recently constructed BMX cycle track in the wood. This is not as acid as the London Clay and thus supports a more abundant and diverse snail fauna as well as dog's mercury *Mercurialis perennis* which favours a heavy alkaline soil. The Lambeth Formation extends into a narrow band across Nonsuch Park in the valley floor and retains the water in the Balancing Pond as it was dug into this clay. The steep slope leading to the fields flanking the London Road is composed of younger London Clay that is more acidic (pH 5.5), wet and poorly drained in rainy weather but baked hard and cracked in summer drought. This also impacts on plant roots and invertebrates. London Clay forms high ground in various parts of south London including Nonsuch Park.

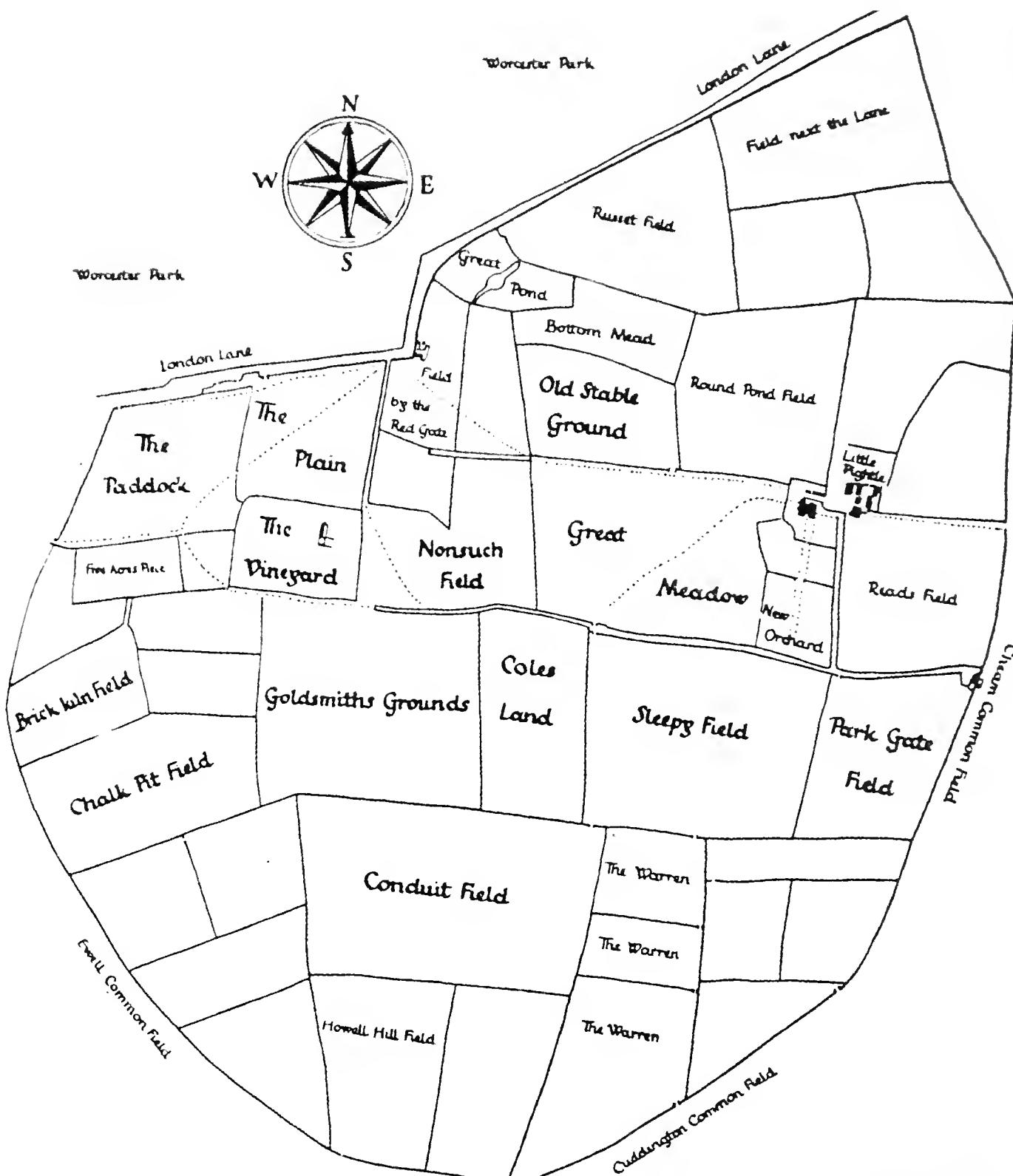
Maps

An early map of Nonsuch from a survey of the seat of Joseph Thompson in 1731 shows the Little Park divided into fields and a name is given to most of them (Figure 7). It is also interesting to see how the field boundaries relate to the geology of Nonsuch and this would have related to the agricultural uses of those fields in the past (Table 1). The excellent Cassini Historical map sheets have been published since 1994 and give a view of the land around 1800, 1897 and 1920 showing the change in landscape from a fully rural to urban one. They have been cleverly designed using digital methods to combine different map sheets and present them on a scale to match the Landranger sheets at 1:50,000, here West London 176. Ordnance Survey grid lines have been added to maps that did not have them initially which is a great aid in comparing maps of different date for change. Whilst Surrey is now regarded as one of the most wooded counties in England, this was not the case in earlier times when communities depended on their own land for largely subsistence agriculture as well as extensive sheep walks on the North Downs, and so trees were concentrated around landscaped gardens or parks of large houses apart from little blocks of coppice woodland supplying communities with large and small timber. At Nonsuch in 1800 there was just a suggestion of a linear perimeter tree belt (possibly elm) along the London Road that once had the name of Elm Lane. There was a small area of trees, probably the orchard, around Cherry Orchard Farm near the bend in The Avenue, behind the Mansion House gardens (the arboretum) and part of what is now Cheam Park, landscaped pleasure grounds of the former Cheam House. The Nonsuch stream (the Earthbourne) is shown and the number 13 by the London Road denotes the mileage from London and probably the presence of a milestone. There is a similar figure 12 at North Cheam in a position when I remember a milestone being present in the 1950s.

The residential development of London led to a number of street Atlases and one which I was shown by Beryl Long (Geographia c. 1930) depicted a perimeter tree belt behind Wickham Avenue on the northern boundary of Nonsuch Park of the former daisy field but it was not present along the 'Field Next the Lane' adjacent to the London Road, and although there is a perimeter woodland belt there today this small section is devoid of the old mature oaks of London Road Plantation and the strip including The Wood behind Cheam Recreation Ground. Old maps give useful information on habitats of the past.

TABLE 1. **Field names of Nonsuch.** Names for the fields of Nonsuch Little Park were given in a survey map of 1731 for Joseph Thompson who had bought Nonsuch. A map adapted from this survey is given in Dent (1981), see page 90. The Warren, Conduit Field and Howell Hill Field are not shown in the table as, although part of the Little Park, they are on the other side of the railway land and not part of the Nonsuch Park/Warren Farm public open space. The table gives the name for each field, a description of its current location and the underlying geology.

Old field name	Location	Geology
Field next the Lane	Behind Wickham Avenue to Sparrow Farm Road Gate	London Clay
Russet Field	Continuation along London Road to Balancing Pond	London Clay
Great Pond	Balancing Pond area	Alluvium and Head over Lambeth Formation Clay
Bottom Mead	Flat land below slope from Balancing Pond to Oak Plantation	Alluvium and Head over Lambeth Formation Clay
Field by the Red Gate	Ewell Gate car park area	Alluvium, Head and Lambeth Formation Clay
Nonsuch Field	Nonsuch Palace site to The Avenue near Ewell Gate	Thanet Sand and Chalk
Great Meadow	Flat land between Nonsuch Field and Mansion House	Head over Chalk
Old Stable Ground	Flat land between Great Meadow and Bottom Mead	Head over Chalk
Round Pond Field	Flat land with Round Pond to driveway to Mansion House	Chalk, Thanet Sand and Head
Reads Field	By Cheam Gate near Nonsuch High School	Head over Chalk and Thanet Sand along The Avenue and Fir Walk
The Plain	Old nursery site and Cherry Orchard Farm to London Road near the Ewell Gate	Lambeth Formation Clay with some Thanet Sand along The Avenue
The Vineyard	Cherry Orchard Farm near the bend in The Avenue	Thanet Sand and Lambeth Formation Clay
Five Acre Piece	Banqueting House site and field bordering the Ewell Bypass	Thanet Sand and Lambeth Formation Clay
The Paddock	Pottery wood at edge of Cherry Orchard Farm – old clay pits	Lambeth Formation Clay
Goldsmiths Grounds	Warren Farm by the bend on The Avenue	Chalk, Thanet Sand and Head
Coles Land	Central valley through Warren Farm	Chalk and Head
Sleepy Field	South-facing field behind Nonsuch High School near Cheam Gate	Chalk and Thanet Sand
Park Gate Field	Land of Nonsuch High School, not part of the Nonsuch open space	Head over Chalk and Thanet Sand



Courtesy of Trustees of British Museum

SURVEY MAP OF THE LITTLE PARK, 1731

(Adapted from *A Survey of Nonsuch Park, the seat of Joseph Thompson*)

FIGURE 7. Map showing field names in Nonsuch Little Park in 1731, from Dent (1981).

Habitats and management

Habitats are dynamic, they change and will continue to do so as a result of human action as well as natural forces and usually a combination of the two. Maintaining the status quo is extremely difficult and like balancing a pyramid on its point so conservation management is a delicate balancing act. However, it has to be recognized that human pressure can be damaging to both wildlife and the tranquillity of the site, an important part of its amenity role to the human population so some control is necessary. The 1993 survey discussed the transition from a mixed role of agriculture and amenity to one of amenity only when Warren Farm ceased to be cultivated in 1986. Since the last report the

abandoned local authority plant nursery site along the London Road by the Ewell Gate, after sport development plans were overturned in 1999, has now been incorporated into Nonsuch Park and an entrance and path made through it from Bluegates to Cherry Orchard Farm. Potentially dangerous rubbish on site was cleared but some stonework was left for slow-worm shelter with scrub and tree stock retained to continue giving shelter to birds and mammals that have long used this site as an undisturbed refuge, human access being effectively limited to the path. Warren Farm is now safe from housing development in the hands of The Woodland Trust as a result of a Schedule 106 Agreement at Public Inquiry and has started to mature into a most interesting and flower-rich chalk grassland community. The main issue, pointed out in 1994, was the invasion of Canadian goldenrod that had soon spread throughout the site. Roger Hawkins had successfully eradicated this alien from Banstead Downs by hand-pulling (Hawkins 2003) and he, together with Nonsuch Watch and other volunteers, has made an impressive show of removing it from Sleepy Field that is the focus of the pyramidal orchids. Removing remaining isolated plants from this field year by year will be a relatively easy task but massive effort is needed to pull on the rest of the site. New volunteers to continue this are urgently needed (contact the author or Nonsuch Watch nonsuchwatch@gmail.com).

Most of Nonsuch consists of grassland communities that vary between the fields as a result of the underlying geology, soil type, moisture and management. Following ecological surveys that were initially contracted by Nonsuch Watch, meadow management has been adopted allowing the vegetation to grow tall; plants to flower and set seed before mowing: the flowering plants and insects have benefited from this. A Management Plan for Nonsuch Park was commissioned by Epsom and Ewell and was undertaken by Isobel Girvan of the Surrey Wildlife Trust in 2005. A new Management Plan by Peter Howarth, ecologist at Epsom and Ewell, is currently in progress. Short-mown grass is maintained in the dog-free picnic areas by the three entrance car parks, in the field at the Cheam Gate and as walkway strips through the meadows, so family groups and dogs can move around Nonsuch without disturbing the grass sward. There is also short-mown grass on the lawns of the Mansion House garden, which being a long-established mossy lawn, has the potential to be an interesting habitat for fungi provided that fertilizers and herbicides are not used. This needs to be brought into the management plan for the garden.

Meadows on Thanet Sand from the Mansion House to the palace site are largely spring meadows with bulbous buttercup, germander speedwell, cut-leaved and dove's-foot crane's-bills, lesser stitchwort and bird's-foot trefoil, but also lady's bedstraw, some ox-eye daisies and occasional field scabious and early grasses like field woodrush, sweet vernal grass, meadow foxtail and meadow barley-grass. Low nutrient prevents rank growth.

The fields on the London Clay alongside the London Road have changed since meadow management was brought in and they are now impressively colourful meadows flowering in mid to late summer as the wet clay takes longer to warm up in spring. The plants here are all common ones but typical of semi-acid grassland and their flowers are a valuable source of nectar and pollen for insects and a foraging ground for some birds. With the exception of the field by the Sparrow Farm Road car park they were in arable use for cereal crops up to the early 1960s. Typical flowers are meadow buttercups, bird's-foot trefoil, agrimony, selfheal and common knapweed.

Warren Farm, the last area under the plough, has gone through a transitional phase of pioneer species like poppies as recorded by Dr Jean Byatt over twenty years ago and has now developed into a flower-rich chalk-grassland flora with good colonies of kidney vetch, yellow rattle, common broomrape, hop trefoil, grass vetchling, thousands of pyramidal orchids and other orchid species. It is also a very rich site for insects and invertebrates including chalkland specialists. It would be a pity to see this lost by tree planting as was once proposed especially as calcareous grassland is a diminishing habitat in Surrey whilst woodland is not. The evolving Warren Farm grassland is a special part of Nonsuch.

Woodland is the next largest habitat area in Nonsuch Park consisting of belts along the London Road, the perimeter behind Wickham Avenue to Cheam Gate, The Wood (now designated as ancient woodland), a central oak plantation, various copses in fields, the pottery wood at the edge of Cherry Orchard Farm, and the secondary sycamore wood developed since the 1960s along the old dual carriageway abandoned uncompleted in World War II. Oak woodland is the climax vegetation for Nonsuch and a largely oak top canopy traditionally dominated the woods and they still contain many fine mature oaks. Historical records show that wych elm was part of the medieval landscape of Nonsuch. The perimeter woods are mixed woodland incorporating wych elm, ash and Scots pine but self-sown sycamores are invading and growing towards the top canopy in places. It appears that sycamore may become the dominant tree as its shade and fast growth will deter saplings of oak as a slower growing tree unable to develop in the shade. More successful seedlings of oak are seen in the open terrain of Warren Farm. Beech, that requires well-drained soil, occurs in the edge around the Cheam Gate and lower part of Cheam Park on the Chalk or Head deposits. Secondary tree layers include the Midland hawthorn *Crataegus laevigata*, hazel and field maple.

There are informal trodden paths through the perimeter tree belts that can be walked and are rewarding to explore for the woodland flowers in spring. My impression is that the woodland flora is becoming richer. Good patches of goldilocks, or the woodland buttercup, were found in the London Road Plantation in April 2014 and violets were also in flower. Spurge laurel *Daphne laureola*, an evergreen shrub, grows in The Wood and extends beyond.

Scrub exists in certain areas where the common hawthorn has invaded fields alongside the London Road Plantation and there are bramble patches in Cherry Orchard Farm. This is a valuable habitat that provides much-needed refuge for birds and mammals in a public amenity site as well as livelihood for a wide range of insects. The brown hairstreak butterfly lays its eggs on blackthorn. Being prickly, scrub patches can serve as a barrier keeping people away from standing dead wood, another valuable habitat, and so managing the risk. Dead hollow trees are valuable roosting and nesting places for bats (all legally protected) and birds like woodpeckers.

Fungi and myxomycetes (slime moulds)

Since 1994 a number of new species of fungi and slime moulds have been added to the list together with ecological and phenological observations made as a result of Nonsuch Watch field meetings, some of which were reported in the *Nonsuch Watch Newsletter* and independent visits by the author and others. Most of the previous records were made by the late Peter Holland and he was particularly interested in the smaller species — rusts, mildews and slime moulds — rather than the larger fungi. Dr Brian Spooner, co-author of *Fungi*

in the New Naturalist series (Spooner and Roberts 2005), joined a Nonsuch Watch field meeting in April 2013 at which he made impressive records, again concentrating on the smaller fungi and achieving one new record for Britain, new for England and possible new species yet to be described. Will they be called *nonsuchparkensis*? He continues to take an interest in Nonsuch fungi, particularly as material for a forthcoming publication on the fungi of Surrey.

Slime moulds, strictly called myxomycetes, are not fungi but in a group of their own and outside the Plant or Fungus kingdoms, although traditionally studied with the fungi. They start their life history as wandering amoeboid cells feeding on bacteria and fungi and so have been classed with the animals in the Kingdom Protozoa. Later the wandering amoeboid cells pair up with a mating partner and form a plasmodium stage, often seen in the autumn, but when the food source is depleted they then form spores. Some, like the plasmodium stage of *Lycogala terrestre*, can be seen on fungus forays on dead wood as apricot-coloured spheres about a centimetre across: this was found on old sycamore wood in the northern perimeter woodland strip of Nonsuch Park, alongside Cheam Park. As most slime moulds and other stages of the life cycle are very small, detailed examination is needed under a microscope by specialists in this group. In the fresh state slime moulds can be very colourful and attractive as illustrated by photographs in Sterry and Hughes (2009: 334–5), but when dried in a collection this brilliance is lost.

Table 2 (page 130) shows over sixty additional species of fungi and slime moulds recorded since 1993. This is the result of fieldwork and in the case of the smaller fungi, specialist input. There are many gaps still to be filled and it is difficult to make much comment on the ecology until more work has been done. As the park was only opened to the public in 1937/8, unlike other sites in south London popular with naturalists that have been accessible for longer, Nonsuch has little historical data with which to compare. Much needs to be done recording fungi in the various niches of leaf litter, dead wood, parasites, helpful mycorrhizal species associated with oak, beech and conifers in particular and also fungi of grassland, the old Mansion House lawn as well as fungi of disturbed sites and the new woodchip habitat in order to pick up a good range of species.

Sycamore and ash trees that are rapidly spreading through self-seeding do not support mycorrhizal fungi on the ground below, possibly because they live on richer soil and have less need for assistance from fungi in obtaining nutrients and they also do not make a dense leaf-litter, so most fungi associated with sycamore and ash are those of dead wood. Both of these trees are extending their range and abundance in Nonsuch through self seeding and wind-dispersed winged fruits. The range of soil types from chalk on Warren Farm, through Thanet Sand to clays of the Lambeth Formation/Reading Beds and London Clay also affects the local distribution of ground-living fungi in Nonsuch. Some of the grassland species are associated with low-nutrient conditions, hence the importance of unfertilized ground.

Since 1994 interest in fungi has expanded nationally resulting in many new field guides and county fungus recording groups being set up and it is hoped that the Surrey Fungus Recording Group will help to fill in details on the fungi in Nonsuch. There are however some 12,000 species of British fungi (Spooner and Roberts 2005), with certain genera having over a hundred species of which only a small percentage is covered in the guide books. The need for the specialist however does not prevent the naturalist from exploring and enjoying

acquaintance with larger fungi that are visually attractive, easy to recognize and for them to be able to make useful ecological observations or for the beginner to start on the interest. The author's own grounding in fungi came from Nonsuch, collecting specimens from Nonsuch Park as well as the strip of mature elm trees that then separated the upper hockey pitches from Warren Farm in the grounds of Nonsuch County School for Girls (as it was then called in the 1950s). For me these provided far more interest than the hockey and they were named using *The Observer's Book of Common Fungi* (Wakefield 1954) topped up with information on their way of life from the original *Mushrooms and Toadstools* in the Collins New Naturalist series (Ramsbottom 1953). It is sad to see how much of the former open area of the school grounds has and is still being taken over by formal sport and built development: as a pupil I would not have been impressed!

Nonsuch provides a mesotypic fungal flora, lacking in heathland species, but nevertheless something to provide a framework for an interest that in my case has lasted for over half a century. Fungi can also inspire creative work in art, photography, folklore and writing. Much of the current popular interest in fungi has been focused on their culinary use but they are not sufficiently abundant in Nonsuch for this to be a threat. Many of them, although not poisonous, are simply not worth eating and any taken home to cook must be correctly identified and in modest numbers. The poisonous ivory funnelcap *Clitocybe rivulosa* (= *dealbata*) grows on the Mansion House lawn and the yellow stainer *Agaricus xanthoderma* that is also poisonous below oaks near the service wing.

Whilst autumn is the traditional fungus foray season providing the peak of toadstools appearing above ground in response to combinations of temperature and moisture as well as season, the experienced mycologist knows that there are to be some fungi found at almost any time of year and they all need recording. Spring is the time to look for St George's mushroom *Calocybe gambosa* (Figure 8) at Nonsuch and they have been found in grass along the avenue behind the Mansion House and growing in a part circle in the Nursery site from April, with 23 April being St George's Day. In summer Dryad's saddle *Polyporus squamosus*, a large tan-coloured bracket, emerges conspicuously from stumps or trunks of trees especially those in decline as it is a wound parasite. Fine shows of brackets were seen on the Nonsuch Watch walks on 12 July 2010 and 14 July 2013. In subsequent years oak bracket *Inonotus dryadeus* was found emerging from low on the trunk of a mature oak in summer. Winter and early spring, after the autumn fungus harvest is over, is the best time to see fresh Jew's ear *Auricularia auricula-judae* (Frontispiece), noted in Cherry Orchard Farm on 27 December 1999. Dead elder wood was the usual habitat for this species but in recent years in Nonsuch and elsewhere, large fruiting bodies have been appearing on dead sycamore wood too in the perimeter wood by Cheam Park. However unfavourable intense frost and cold may be for fungi, there are invariably dead ash branches around with crampballs or King Alfred's cakes *Daldinia concentrica* to be found, these and other woody fungi like candlesnuff *Xylaria hypoxylon* are the salvation of many a fungus foray arranged well in advance that fails to hit the main flush of fleshy fungi due to variables of weather. Fungi can be unpredictable.

Fungal decay is a natural part of a tree's senescence and also in dead wood of a living tree there is a sequence in the fungal species arriving as part of succession in the ageing and decomposition process. One of the veteran oaks in Nonsuch, alongside the drive and Oak Plantation (Figures 1 and 2) has been



FIGURE 8. St George's mushroom, Nonsuch Park.

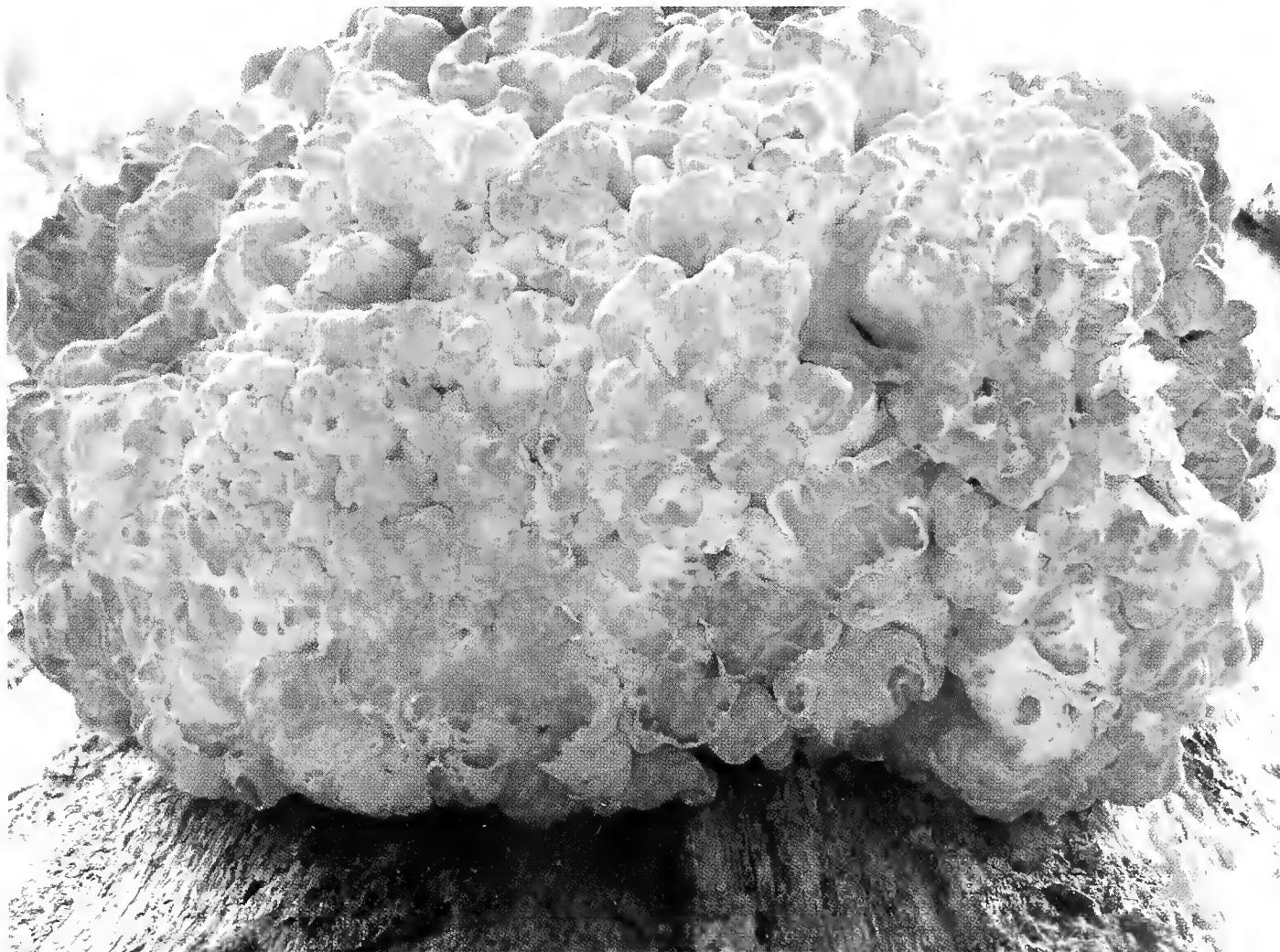


FIGURE 9. Chicken-of-the-woods on the trunk of the hilltop veteran oak, Nonsuch Park.

showing senescence in recent years, losing large limbs to storms, having strips of bark removed exposing the inner wood trunk (decorticated), showing stag-headed dead branches protruding from the top canopy and a succession of fungi emerging from the trunk. This oak tree produced chicken-of-the-woods *Laetiporus sulphureus* (Figure 9) on 1 August 1999 and subsequently on 15 September 2013, beefsteak fungus *Fistulina hepatica*, a bracket that drips red droplets of liquid, together with smoky bracket *Bjerkandera adusta* and yellow curtain crust *Stereum hirsutum* on a large fallen bough left on the ground below the tree, seen during a Nonsuch Watch field meeting. Living trees contain a certain amount of dead wood, especially in the centre and decomposing fungi deal with this while the outer cylinder of live growing wood continues to function. The tree with a hollow centre may not necessarily be unsafe. Tubular scaffolding is hollow in the centre but still strong: trees make good engineers!

Lichens

There are many species of lichens, some very small as well as others that form more conspicuous coloured patches on trees and branches, but a detailed specialist knowledge, microscope work and chemical tests are needed to make a full list. However, even without identifying species, the greater abundance and range of lichens on the trees has been evident in the last twenty years: this follows a trend across London as coal burning is now a thing of the past. However, it took some time for the bark to de-acidify and an epiphyte flora to colonize.

Frank Dobson recorded over forty species of lichens in Nonsuch for the 1993 survey and he has been involved in further visits. The first of these was in 1995 when the traditional field meeting following the London AGM of the British Lichen Society was held on 8 January 1995 recording from Nonsuch Park in the morning and the churchyard of St Mary's in Ewell village in the afternoon (Chatfield 1995a, b, c; Dobson 1995a). With the eyes of many experienced lichenologists and three further years of improvement to the substrata, the list was brought up to seventy-three species. Habitats explored included the stone garden sculptures and urns, terrace and walls of the Mansion House gardens, trees and especially the willows by the Round Pond that in 1995 yielded the shield lichen *Parmelia perlata*, a good sign of improved air conditions. A further lichen field meeting for Nonsuch Watch was held on 13 April 2003, again led by Frank Dobson, when more species were added to the list. A notable find on this occasion was a small crust lichen *Cyphelium notarisii*, the third record for Surrey that was growing on one of the garden benches by the Mansion House terrace (Chatfield 2003). These benches have now been moved so its current location is unknown (Table 3, page 133).

Dog lichen *Peltigera* continues to grow on old concrete of the former yard of Cherry Orchard Farm that was demolished in World War II. We appeal to lichenologists to assist in monitoring the recolonization of Nonsuch by lichens. Trees are the major habitat. These will be genuine new arrivals rather than species overlooked in the past, an interesting part of the Nonsuch story.

Bryophytes (mosses, liverworts)

Bryophytes have been pointed out on some Nonsuch Watch walks but this did not involve any concentrated study while a more focused evening walk on mosses of the Mansion House gardens for Friends of Nonsuch largely confirmed what had already been recorded. The main species added from field

meetings was *Riccia fluitans*, a lobed floating thalloid liverwort amongst the duckweed on the Balancing Pond (dug only in the mid 1980s) and this has persisted to date. Gardiner (1981) noted *R. fluitans* as ‘infrequent and decreasing because of the drying out and pollution of the ponds . . .’ in a Surrey context and there was no record of it in the whole of the TQ/26 10-km square. Duckett and Pressel (2009, 2010) say of *Riccia fluitans*: ‘perhaps the most capricious of all London’s bryophytes, having been variously found sometimes in great abundance and then disappearing completely from several ponds and lakes.’ The comparatively large size of the Balancing Pond attracting some water birds seems to provide what it requires. I know of a similar stable population of this floating liverwort in old watercress beds at Flood Meadows in Alton, Hampshire. For additional species now recorded see Table 4, (page 135).

A strong impression when comparing the visual situation with bryophytes between 1993 and 2014 is the greatly increased *quantity* of these plants as epiphytes, especially tufts of wood bristle-moss *Orthotrichum affine* that are now frequent and widespread across Nonsuch in the tree belts.

On 21 November 2013 I joined Peter Howarth, Epsom and Ewell Ecology Officer, who is also a fellow member of the British Bryological Society, for a concentrated bryophyte day at Nonsuch. Being short daylength in November we did not manage to cover the whole area and Warren Farm remains to be done. Winter to early spring, with damp weather and the moss plants looking their best is the favoured season for bryological fieldwork. As well as dampness, with leaves off the trees, the woodland and epiphytic species have more light so this is their window of opportunity for growth and sexual reproduction resulting in spore capsules. However, 21 November was distinctly cold, damp and overcast requiring the sort of hardiness well known to field bryologists but not appreciated on more general walks when one is encouraged to take a brisk pace in cold weather. Moss and liverwort hunting is slow work involving scrutinizing trunks of trees closely with a hand lens to pick up the smaller species. As well as confirming considerable increase in quantity and ranges of bryophytes we were able to add several new species to the list published in 1994 as well as seeing most, but not all, of those recorded before. As microhabitats are important to bryophytes some species are local in their distribution within Nonsuch as they require specific conditions.

The major change since 1993 was the great recovery in epiphytes and this follows the general trend reported in the London area (Duckett and Pressel 2009, 2010) from a very low level in the early 1960s’ coal-burning era when I first took an interest in the bryophytes of Nonsuch in the late 1950s. As Nonsuch was not open to the public until 1937, followed by the war years and bryologists were thin on the ground, there is unlikely to be a historical record. Recovery of the bryophyte flora was barely started when Jack Gardiner’s (1981) paper *A Bryophyte Flora of Surrey* was published. E. C. (Ted) Wallace, long-time Secretary of the British Bryological Society lived in Sutton, not far from Nonsuch, but it is unknown whether he ever collected at Nonsuch and the TQ/26 square in which he lived at Sutton had fewer bryophyte records in 1981 than most other areas of the county, being in the coal-smoke-polluted area of the outskirts of London. As Wallace’s herbarium is currently at the National Museum of Wales, this needs to be researched.

Three species of epiphytic liverworts have colonized trees: two leafy liverworts with the maroon patches of *Frullania dilatata* and fine green strands of well-named *Colojeunea minutissimma* seen with a lens as well as a small green

branched thalloid liverwort *Metzgeria furcata* that can form round patches on trunks, especially young ash trees with a smooth bark. Additions to the erect mosses (acrocars) were *Syntrichia papillosa* with gemmae on the midrib (lens again!), *S. latifolia*, cushions of *Ulota bruchii* identified to species on the shape of the capsule, and small but bright green *Zygodon viridissimus*. Ash and willows with alkaline bark provided the substratum for these in the North Plantation, The Wood and Round Pond habitats. Additional branched or feather-mosses (pleurocarps) growing as epiphytes were *Cryphaea heteromalla*, *Hypnum resupinatum* and *Leptodictyum riparium*. An interesting case is *Cryphaea heteromalla*, a distinctive moss that is easily recognized with its curved shoots projecting out horizontally from tree trunks and capsules on very short setae arising from the stem not the tip, making it a pleurocarp but looking more like an acrocarp, something to catch you out in an early stage of the key if working on infertile material. This was on willow at the Round Pond but also in The Wood on another tree: it is often on elder. Malden (1902) lists it as frequent while Wallace in 1941 was finding it on beech and elder on the downs (Duckett 2008), but Gardiner (1981) described it as greatly decreased in Surrey. The situation was similar in Hampshire: on a visit to Milking Hanger near Selborne with the British Bryological Society in 1986, we failed to locate it whereas it is present there now. Likewise, neither Jeff Duckett nor the late Roy Hurr came across it at Nonsuch in 1993. Its return to the London area is given in Duckett and Pressel (2009, 2010). *Leptodictyum riparium* is a species of wet places, especially by rivers and ponds and at Nonsuch it was found on willows at the Round Pond. This pond is historic but its surrounding vegetation has changed greatly from the 1950s when it was remarkably open and fringed with rushes, now largely shaded out, and is almost completely circled by well-grown trees. However, the Round Pond willows have provided good habitat for the colonization of bryophytes as well as lichens.

There are limited numbers of walls and they are associated with the Mansion House and the Banqueting House retaining wall. It was on brick at the Banqueting House that the small yellow-green silky feather-moss *Rhynchostegiella tenella* (Figure 10) was found in a shaded spot on 12 April 2014: the lime probably came from the mortar. *Rhynchostegium murale* was also found there on 21 November 2014. Brick at the base of an outhouse near the Mansion House cart shed area provided a habitat for *Tortula marginata* with a turf of *Didymodon nicholsonii* on hardstanding below. This is another moss, originally associated with river flood zones, that has spread in recent years, now colonizing damp tarmac and paths in abundance. Increased nutrient levels of nitrous oxides from car fumes may be assisting some opportunist species in urban areas, a phenomenon picked up by the Opal lichen project run from the Natural History Museum. This type of air pollution is of current concern in the London Borough of Sutton and Cheam. It is good to report that the colony of leafy liverwort *Porella platyphylla* previously recorded on the flint-and-brick outside of the garden wall of the Mansion House is still flourishing.

It is clear that the Clean Air Acts of 1956 and 1968 reducing and prohibiting the burning of coal have cut out the sulphurous gases and particulate soot that caused smogs in the 1950s and 1960s and were responsible over a century of time in more or less eliminating bryophytes and lichens from urban areas. It took some time for the deposits of pollutants to wash off the trunks and branches of trees and be in a condition to receive bryophyte spores in the air from remaining reservoir populations or propagules on the feet and feathers of

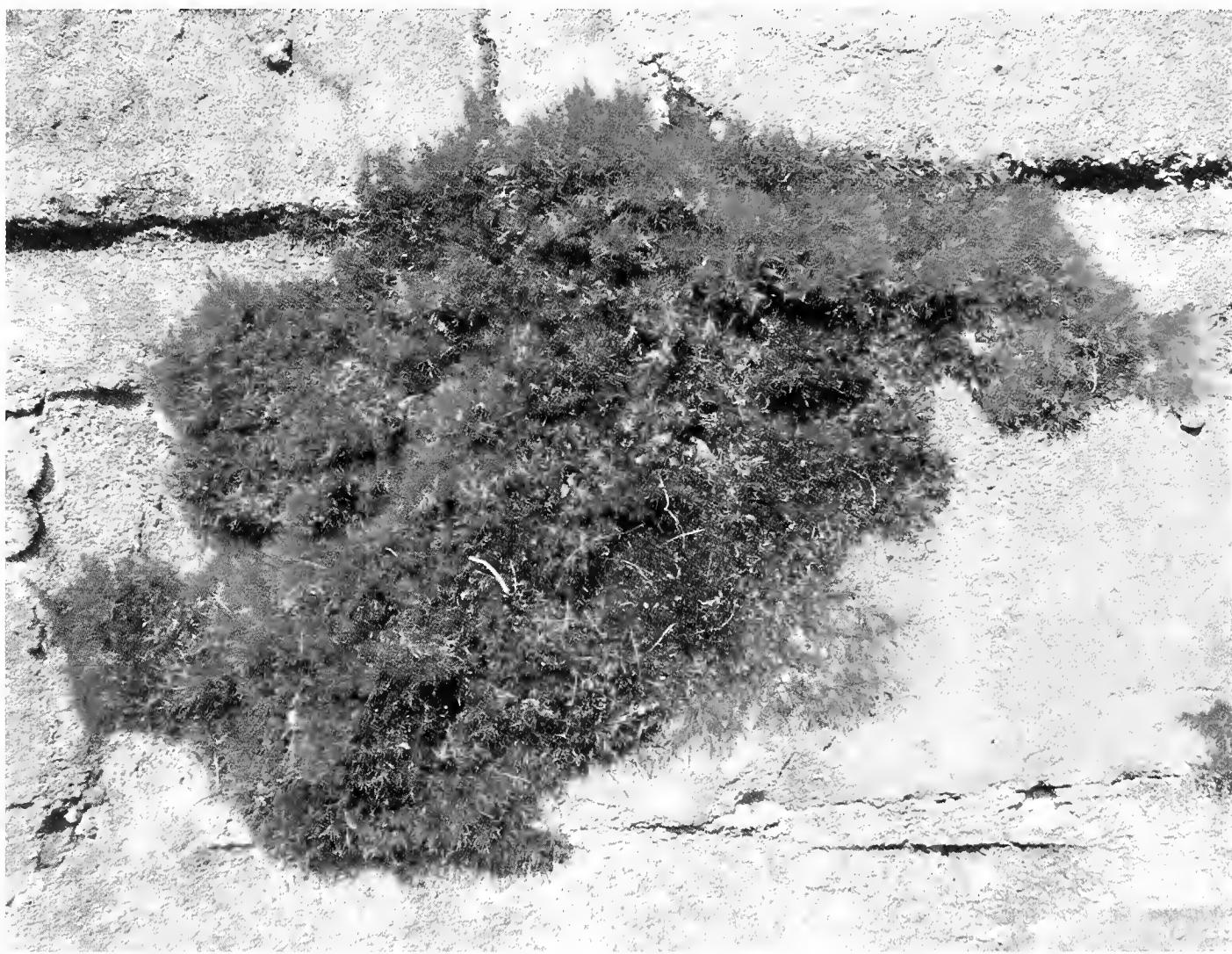


FIGURE 10. Silky feather-moss *Rhynchostegiella tenella* on the retaining wall of the Banqueting House mound, Nonsuch Park.

birds on passage. Recovery of London's bryophyte flora started to be noticed in the 1990s but gathered momentum about 2000. Another important factor in the recolonization appears to have been the run of wet and mild winters in the last fourteen years during the main growing season of these plants (Kington 2010). In commenting on the low abundance of epiphytes at Nonsuch in 1993 of even common species, Roy Hurr concluded that a dry microclimate at Nonsuch in the rain shadow area might be the reason now that the pollution was cured (Chatfield 1994). One element of the bryophyte flora that was lost from Nonsuch unrecorded was the arable flora since cereal growing finally ceased in the late 1980s at Warren Farm.

Since 1994 there have been two books published to greatly assist and inspire new bryologists. An account of the natural history of bryophytes that brings in much recent research and concentrates on their habitats and species assemblages is *Mosses and Liverworts* in the Collins New Naturalist series (Porley and Hodgetts 2005), and to help with identification is *Mosses and Liverworts of Britain and Ireland: a field guide*, with keys, distribution maps and numerous colour illustrations (Atherton, Bosanquet and Lawley 2010). The internet has also changed the scene as the excellent website of the British Bryological Society gives contacts for the local field meetings (south-east includes Nonsuch area) as well as much else to help the beginner and expert alike (www.britishbryologicalsociety.org).

Further fieldwork is merited at Nonsuch to follow the bryophyte recovery. They will have a place in the revised Management Plan via the policy on retaining dead wood. Bryophytes perform a useful environmental service as

indicators or air and soil conditions. It will be interesting to see what might be reported twenty years again from now, but another author will be writing that report.

Vascular plants (ferns, horsetails, flowering plants including trees)

The flora of Nonsuch has developed and changed over the last twenty years due to management, weather, climatic trends and eutrophication, and from nitrous oxides derived from motor vehicles. Some additional species merely fill gaps in previous recording of plants that were there before 1994 while others are genuine new arrivals like the orchids. Over a hundred new species have been added to the Nonsuch list of 1993 bringing it up to over 370. Future field work will doubtless yield more. Additions are given in Table 5 (page 136). Since 1993 there has been greater notice taken of alien introductions that are here to stay and therefore need recording and including in the field guides. Hybridization and the study of difficult genera has also moved apace, assisted by DNA studies in professional laboratories. Some groups, like the brambles, dandelions and hawkweeds, that reproduce apomictically, come as complexes of numerous microspecies that have not been incorporated in this survey.

Only two species of pteridophytes were listed in 1993, since when two more have been added and the others found in more sites. The field horsetail *Equisetum arvense* is also on the old nursery off the London Road both as green shoots for food production and cream shoots bearing cones for spore production in April. It is a colonist of waste ground and a weed in gardens due to its rapid spread by runners. Maidenhair fern *Asplenium trichomanes* is established on the brick railway arch facing Warren Farm, the type of habitat it is now colonizing in various parts of London. Male fern *Dryopteris filix-mas* has been found in Nonsuch Park in the perimeter woodlands and along the Portway near the Banqueting House as well as the old nursery. Water fern *Azolla filiculoides*, looking like a feathery duckweed, covered the surface of the Round Pond on 13 September 2008 where it turned an attractive crimson in autumn, but it has not persisted in subsequent years which is my experience on other ponds in Hampshire. *Azolla* is an introduction from South America and could have come from a garden pond on the feet of birds or with pond weed thrown in.

There are only four species of gymnosperms or conifers native to Britain but others are commonly planted. Yew *Taxus baccata* is normally found on the North Downs but occurs at Nonsuch in the perimeter woodland belts: it germinates from seeds spread by animals like foxes that eat the sweet red fleshy aril and vomit the poisonous seeds away from the parent tree. Scots pine *Pinus sylvestris* was planted in Nonsuch in perimeter belts and copses and is only native in Scotland. Also planted just outside the Mansion House garden is Japanese larch *Larix kaempferi* in which the scales are reflexed in the ripe cone. A primitive maidenhair tree *Ginkgo biloba*, now rare in the wild in China, is commonly propagated here and in autumn its characteristic fan-shaped leaves may be found on the ground, bright yellow, in the Mansion House garden. I always remember finding these from visits to the Nonsuch gardens in the 1950s.

A number of other exotic trees have been planted in the Mansion House gardens while some naturalized and native herbs of interest and attraction grow there. In early spring naturalized snowdrops *Galanthus nivalis* flower in the dell and in the tree plantation by the path alongside the front lawn. In the latter

place is drooping star-of-Bethlehem *Ornithogalum nutans* that makes a good show later in spring while another species of *Ornithogalum* was seen and photographed in flower in the Great Meadow just outside the gardens. Distinctive leaves of star-of-Bethlehem from a single plant were seen in the field between the oak plantation and the Brown Pond in May 2014.

New records have come from two of the ponds. The Round Pond near the Mansion House is an historic one dating back to at least 1731. It has changed from being an open pond surrounded by rushes in the 1950s to being almost completely enclosed by trees with some planted white poplars *Populus alba* on the south side, and willows, hawthorn and oak on the north. It has a variable level from water filling the depression to exposed wet mud that generates its own flora from germinating seeds until the pond fills again. Pond water-crowfoot *Ranunculus peltatus* with round floating and linear submerged leaves was seen and photographed in flower emerging through a film of lesser duckweed *Lemna minor* on 9 June 2007. As described above, the water fern *Azolla* arrived and was photographed blanketing the pond on 13 September 2008. New plants appearing on the exposed mud in receding water levels have been trifid bur-marigold *Bidens tripartita*, marsh cudweed *Gnaphalium uliginosum* and the marsh foxtail grass *Alopecurus geniculatus* with grey-green leaves and bent nodes that flowers in midsummer.

The Balancing Pond near the Ewell Gate (= Newly Dug Pond of 1994) had already established a waterside and aquatic flora in ten years (1994). Whilst some colonization may have been natural as the pond was dug for flood defence purposes rather than ecology, it appears that well-meaning but misguided members of the public augmented it with spare vegetation from their garden ponds and this may have been the origin of unfortunately invasive aliens from aquaculture, namely New Zealand pigmyweed or Australian swamp stonecrop *Crassula helmsii*, and parrot's-feather *Myriophyllum aquaticum*, that are very difficult to get rid of. They were often sold in garden centres for domestic ponds but this has now been banned by the Environment Agency, although the gene is long out of the bottle. Parrot's-feather was already present in 1993 although incorrectly identified as marestail as there was less focus on alien species then or awareness of the parrot's-feather problem. Whilst many of the previously listed plants remain, their proportions have changed and reedmace or bulrush *Typha latifolia* had soon spread by about 2000 to almost fill the pond except at one end where swimming dogs kept it free of vegetation. Ivy-leaved duckweed *Lemna trisulca*, that I remember from the former Snail Pond in the 1950s, occurs in this large pond as well as the more common lesser duckweed and the introduced least duckweed *L. minuta*. Least duckweed may have come in with waterfowl or amongst discarded garden pondweed as I have seen it in garden centres in troughs with the water weeds for sale. The hairy sedge *Carex hirta* is well established around the Balancing Pond. By June 2007 common spotted orchids *Dactylorhiza fuchsii* have been regularly seen in flower around the pond and adjacent meadow in June. A London Natural History Society botany field meeting on 25 June 2011 recently added further species and this was reported in the LNHS Newsletter (Parker and Hounsome 2011).

Few woodland plants of note were recorded in 1993 apart from dog's mercury *Mercurialis perennis* in woodland between Cherry Orchard Farm and the Banqueting House field, goldilocks in the same area and spurge laurel *Daphne laureola* (Figure 11) in The Wood. This block of mature oak woodland is the oldest wood in Nonsuch Park and is now listed with Epsom and Ewell

Borough Council as of ancient woodland status. Spurge laurel is doing well there and extending into the perimeter wood along by Cheam Park: it flowers in early spring with fruits set as black berries ripening early in summer. Spurge laurel is typical of woodlands on the chalk and the author is familiar with it on Selborne Hanger in Hampshire. However its evergreen glossy leaves are not to be confused with another shrub and garden escape, cherry laurel *Prunus laurocerasus* that Isobel Girvan (2005) in her Management Plan warned should not get out of control. Clearing parties will need to get their identification right and not pull out spurge laurel by mistake.

Walkover surveys have been done in late spring 2012–2014 along the London Road Plantation and the North Plantation, through The Wood and to the Cheam Gate to list the flora. Some bluebells were recorded in 1993, erroneously as the native species *Hyacinthoides non-scripta*, but in the last twenty years there has been much focus, particularly by Plantlife, on the widespread nature of the garden or Spanish bluebell *H. hispanica* but also hybrids. The native bluebell is a deeper purple-blue colour, a long parallel-sided corolla tube, the flower heads droop, the petal lobes are curled back and the leaves narrower while the Spanish bluebell is a paler blue, a more bell-shaped corolla tube with petal lobes spreading rather than rolled under, flower head erect held on a stiffer stalk and broader leaves. With the North Plantation backing onto gardens of Wickham Avenue non-native garden bluebells would have come over garden fences during the years since the 1930s when the houses were built. There is also the possibility of garden/native bluebell hybrids as in the 1930s, when the local gardens were being stocked, bulbs were sometimes dug up from Box Hill to establish in gardens and there were no laws to prevent it. The author also remembers seeing in the late 1940s and early 1950s packs of cyclists



FIGURE 11. Spurge laurel in flower in The Wood, Nonsuch Park.

at the end of the day in May pedalling back home from the Surrey countryside along the London Road with swathes of picked bluebells attached to the saddlebags of their bikes. We all picked bluebells then!

Old maps show little true woodland in Nonsuch and apart possibly from a medieval coppice wood of Cuddington village, Nonsuch probably did not have native bluebells so the garden ones that have been spreading a good deal in the last twenty years are likely to be doing no harm and give pleasure to Nonsuch visitors in spring, making the perimeter woodland paths colourful with bluebells together with lesser celandine, violets and cow parsley also in bloom. Early wood violets *Viola reichenbachiana* were found flowering in Nonsuch Park in the North Plantation in April 2000 and common dog violet *V. riviniana* in the London Road Plantation in April 2014. The most significant woodland flower in this plantation is goldilocks, the woodland buttercup where some large patches were found and photographed between Wickham Avenue and the Sparrow Farm Road gate during a Nonsuch Watch walk on 19 April 2014 (TQ/23094 64465). Its yellow flower is small and rarely has the full five petals and is also distinguished from the creeping buttercup that also occurs along wet woodland paths by the narrow-lobed leaves.

Self-seeded sycamore has spread through Nonsuch in the last half century and a project has started to control some of this by coppicing, starting near the cart sheds. It will be interesting to see how the extra light let in will promote woodland plants. Norway maple *Acer platanoides* has been planted near the Mansion House and self-sown saplings are now in evidence in the old nursery site, North Plantation and elsewhere. Some horse-chestnut saplings were also found but whether they will establish in the wooded belts is not certain as they are usually avenue or parkland trees needing greater light. Pedunculate or English oak *Quercus robur* (Figure 12) is the main top canopy tree traditional to Nonsuch on the clay soils, especially now that standard common elms *Ulmus*



FIGURE 12. North Plantation with mature oak and younger self-seeded trees.

procera have been decimated by Dutch elm disease and survive only as scrub clones. The Oak Plantation in the middle of the park (which we used to call the bird sanctuary as it was then fenced) was planted at one end with the non-native Turkey oak *Q. cerris*. These are now mature trees bearing large acorns in shaggy acorn cups, and sapling Turkey oaks, recognized by their more-pointed leaf lobes, are establishing around the park. In some parts of Britain they have been hybridizing with the native oaks. However the Turkey oak is host tree to parts of the life cycle of some new and interesting plant galls such as *Andricus grossulariae*, one of the tiny gall wasps (see page 119). The ash *Fraxinus excelsior* was always present in Nonsuch but not in great abundance and probably as planted trees. I remember two that are no longer present, one on the bank near the south end of the Oak Plantation that had woodpecker holes in the 1950s and also one at the field edge between the Oak Plantation and the Round Pond, memorable from the lichen-feeding case-bearing moths that lived on the trunk. Ash trees are also found in the perimeter woodlands and there are some self-seeded saplings: their bark is an attractive alkaline substratum for the newly establishing bryophyte and lichen epiphyte flora, especially the smooth bark of younger ash trees.

The hemi-parasite of trees, mistletoe *Viscus album* was seen originally as a single clump on a hybrid poplar in the corner field near the Sparrow Farm Road gate in November 1999. Since then the original host tree fell in wind and has been lost but mistletoe is well established on other poplars in the field with many small to large clumps. Balls of mistletoe that can be quite large are bright green in spring from their active photosynthesizing during winter before the leaves of the host tree come out to reduce their light. Great activity of birds feeding on the sticky fruits, flying to other trees and wiping their bills on the bark would have spread the seeds. Would the increasing flocks of naturalized Nonsuch parakeets have been responsible? They are often seen in this part of the park and have long bred in The Wood. In 2014 a clump of mistletoe was seen on a poplar near the Brown Pond Copse in the adjacent field and it has also spread to the valley below the Oak Plantation. Mistletoe seems to be increasing in both Hampshire and west Surrey too in the last fifteen years where it tends to grow on hybrid lime or hybrid poplar as at Avington Park, Itchen Abbas, Alton and Selborne, Hampshire, and Farnham and Ash Vale, west Surrey. It is less common on its traditional hosts of apple, field maple and hawthorn although it is on old-fashioned apple trees in the garden of Gilbert White's House in Selborne.

Most of Nonsuch is grassland now that agriculture has ceased. The fields vary in their flora according to the rock type on which they occur. Chalkland flowers are concentrated on Warren Farm where Upper Chalk and chalk Head deposits outcrop, although mixed in past ploughing with bands of Thanet Sand that cross the site. In Nonsuch Park chalk is largely overlain by Thanet Sand and chalkland plants tend not to occur apart from lady's bedstraw *Galium verum* in the Great Mead, but chalk and rubble from the excavation of Nonsuch Palace in 1958 was spread across Nonsuch Field and some field scabious *Knautia arvensis* that was first found there in 1993 is still present and was photographed. Warren Farm was the last part of Nonsuch in agricultural use until 1987 and left to natural colonization whilst its fate was decided following sale of the land by the Inner London Education Authority, planning applications and Public Inquiries. This was the situation when the previous Nonsuch paper (Chatfield 1994) was submitted.

Warren Farm came to the Woodland Trust under a Schedule 106 Agreement in 1995 following a Public Inquiry and under their policy some trees were planted but the rest was left open following the wishes of local people. Canadian goldenrod *Solidago canadensis*, already on site in 1993, had noticeably spread by 2000 and in 2009 The Woodland Trust decided that some action was needed and a consultation was held. Their initial plan to deep dig and bury the goldenrod, then plant trees across the site to provide a shaded habitat to discourage regrowth did not meet the approval of conservationists as the wildlife value of Warren Farm and its distinction from Nonsuch Park is focussed on the increasingly interesting chalkland flora and insect life, especially butterflies, that was developing naturally. Unimproved grassland is a habitat in short supply in Surrey and even more so on the fringe of London. The amenity value of open space, and skylarks, would also be lost. A programme of hand-pulling was set up (Hawkins 2013) and this might have loosened the soil and facilitated the germination of dormant native seeds giving more space for their growth. Isobel Girvan was contracted by The Woodland Trust to undertake a botanical survey of Warren Farm in 2010 in which she confirmed its importance for chalk grassland plants.

The species found on field meetings has been fairly consistent over the last ten years. The pioneer colonizers of bare ground like common poppies *Papaver rhoeas* and ox-eye daisies *Leucanthemum vulgare* (frontispiece of *The London Naturalist* 73) have given way to a different suite of plants as a result of natural succession. The highlight is the spectacular appearance of orchids. The first pyramidal orchid *Anacamptis pyramidalis* (Figure 13) appeared on a Workers' Educational Association field visit in 1997, but since then the numbers have grown with several thousand flowering spikes estimated at the time of the British Naturalists' Association visit in July 2012. The focus of these is in the south-facing Sleepy Field behind Nonsuch High School grounds where control of Canadian goldenrod by hand-pulling has taken place, but the orchids also occur in good numbers on the lower slopes on the other side of the valley footpath, especially the area adjacent to Nonsuch Park. In smaller numbers are common spotted orchids and bee orchids *Ophrys apifera*. The appearance and increased numbers of orchids on Warren Farm is in parallel with another disturbed chalk site close by on the other side of the railway line in East Ewell at Surrey Wildlife Trust's nature reserve of Howell Hill. In Alton, Hampshire, pyramidal orchids especially are increasing in numbers on roundabouts and central reservations of the A31 (Chatfield 2012a, Mansfield 2012). The parasitic common broomrape *Orobanche minor* (Figure 14) that is regularly found on Sleepy Field must be one of the best colonies known on the outskirts of London. Other highlights and new species at Warren Farm are both species of yellow rattle (Figure 15) *Rhinanthus minor* and *R. angustifolius* that are hemi-parasites on grass, the smooth tare *Vicia tetrasperma* with all three also found on Ashtead Common, goat's-rue *Galega officinalis*, peach-leaved bellflower *Campanula persicifolia*, traveller's joy *Clematis vitalba*, dewberry *Rubus caesius*, rough hawkbit *Crepis biennis*, great lettuce *Lactuca virosa* and grey sedge *Carex divulsa*. Already present in 1993 there is continued presence or increased abundance of grass vetchling *Lathyrus nissolia*, hop trefoil *Trifolium campestre*, kidney vetch *Anthyllis vulneraria* (Figure 16), blue fleabane *Erigeron acer* and common fleabane *Pulicaria dysenterica*.

Following meadow management at Nonsuch Park in the last fifteen years allowing grass to grow tall, flower and seed, the fields have become more



FIGURE 13. Pyramidal orchids in profusion in Sleepy Field, Warren Farm, July 2012.

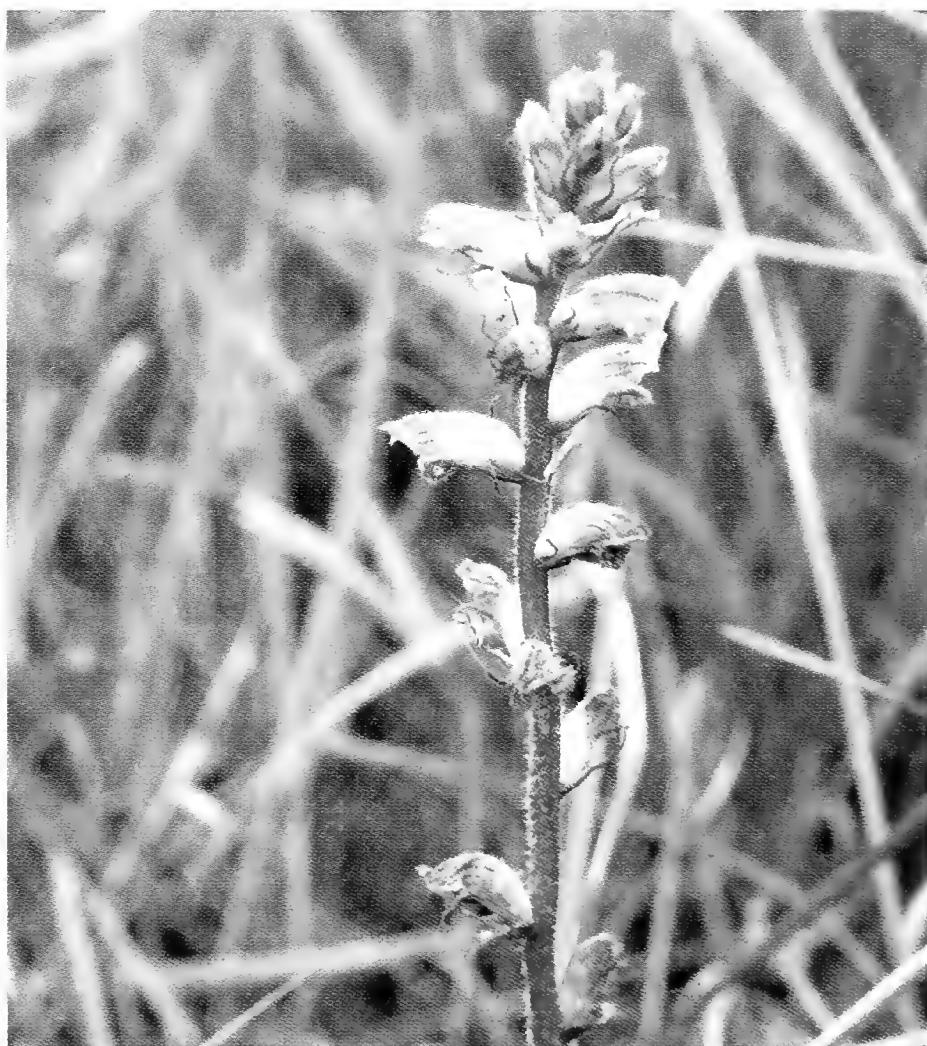


FIGURE 14. Common broomrape, a parasitic plant at Warren Farm.



FIGURE 15. Yellow rattle with seed pods in Sleepy Field, Warren Farm; inset: in flower.



FIGURE 16. Kidney vetch at Warren Farm, the food plant for the caterpillar of the small blue butterfly.

colourful with wild flowers, as spring meadows on the Thanet Sand and summer meadows on the higher ground of London Clay. Details are these are given above. The banqueting house field and grass slope down to the Ewell bypass holds a good population of lady's smock or cuckoo flower *Cardamine pratensis* which supports the caterpillars of the orange tip butterfly: this plant is also present in damp grass around the Balancing Pond. In April bulbous buttercups *Ranunculus bulbosus*, our earliest flowering buttercup with reflexed sepals, and lesser celandine *R. ficaria*, make a welcome show of colour followed by cobalt blue of germander speedwell *Veronica chamaedrys*.

The derelict council plant nursery near the Ewell Gate on the London Road is a site in transition. Some surveys were done in 2008 and 2009 when the tiny smooth rupturewort *Herniaria glabra* was found by Jovita Kaunang as a new vice-county record for Surrey. Miraculously it has survived the building of a pathway through the site giving access to Nonsuch Park. The nursery site was also visited on the LNHS field meeting in June 2011 (Parker and Hounsome 2011) and by the author on 19 April 2014. New species that they added for the nursery site were surviving ex-nursery stock such as narrow-leaved ash *Fraxinus angustifolia*, white-stemmed bramble *Rubus cockburnianus* and blue globe-thistle *Echinops bannaticus*. Also on the site were plants associated with disturbed places near human habitation or brought in with potting materials. These included common whitlowgrass *Erophila verna*, shining crane's-bill *Geranium lucidum*, sand spurrey *Spergularia rubra*, goat's-rue *Galega officinalis*, tutsan *Hypericum androsaemum* and Spanish bluebells *Hyacinthoides hispanica*. This site is changing and there is less open habitat than there was as the old nursery stock trees that were positioned close together for eventual lifting and planting in the boroughs, grow apace. However the dense vegetation gives valuable refuge to animals including protected species.

Oligochaetes (earthworms)

Until recently with the set-up of the Natural History Museum Opal Soil and Earthworm Survey, a simple identification chart (Jones and Lowe c.2010) and the publication of an FSC key to earthworms (Sherlock 2012) there had been no activity in recording earthworms nationally and this remains a project for the immediate future at Nonsuch involving the recently formed Earthworm Society of Britain (www.earthwormsoc.org.uk). Incidental records have been made in Nonsuch Park of the lob worm *Lumbricus terrestris* and the yellow-green earthworm *Allolobophora chloritica*. More species remain to be found including those that leave worm casts. As with other groups the different species of earthworms have different life styles and diets, some making permanent burrows, soil eaters that produce conspicuous worm casts in short mown grass, and detritus feeders living on and among dead leaves.

Molluscs (snails, slugs, mussels)

Although some molluscs were observed during Nonsuch Watch walks and other visits there have been few changes or new species found in the last twenty years. The 1993 surveys involved members of the Conchological Society of Great Britain and Ireland so a good representative list was made. The most notable new arrival is the green or Irish slug *Limacus maculatus* (Figure 17) that was first recorded in Ireland in 1968 under the name *Limax grossui* Lupu 1970, then new to western Europe. Dr Lupu, whom the author met at a



FIGURE 17. The green slug *Limacus maculatus* under a log in Nonsuch Park.

European Malacological Congress in Budapest in 1974, had previously described this species from Romania and the distinguishing features matched my finding in Ireland (Chatfield 1976). After being redescribed as *Limax pseudoflavus* by Evans (1978), both names were later synonymized with *L. maculatus* Kaleniczenko 1851, an earlier discovery in the Crimea, Ukraine by a Russian malacologist. The early description was discovered by Dr Wiktor of Poland who read Russian and had access to their literature (Wiktor and Norris 1982). *L. maculatus* occurs through northern Europe and Russia. Since its discovery in Ireland it started to colonize towns such as Liverpool in the north and has now reached the south, being recorded for Hampshire and Surrey (Kerney 1999). This slug has since been placed in the genus *Limacus* (Anderson 2008). The green slug is recognized by its body colour, coarse tubercles, stronger dark pattern, internal anatomy, woodland habitat and behaviour from the similar yellow slug *L. flavus* L. that has long been known in Britain around buildings and walls, but the yellow slug is often overlooked as it is strongly nocturnal hiding deep in crevices by day. Although *L. maculatus* will occur around settlements, and crawls on walls at night, it is also found in woods where clusters of individuals may be located under logs. It is in this situation that it occurs in The Wood and perimeter wood to the Cheam Gate in Nonsuch Park as well as the wooded Portway footpath alongside Cherry Orchard Farm to the Banqueting House. Finding it is a log-rolling exercise.

The identification of slugs has posed some difficulties in recent years but research on their DNA at the National Museum of Wales has enabled a new publication *Slugs of Britain and Ireland* (Rowson et al. 2014) to assist future survey work. Difficulties however remain as this work has confirmed suspected hybridization but it does helpfully include the more-recent introductions not

included in previous field guides such as the Spanish slug *Arion vulgaris* that has featured in the media. Most of the aliens appear to have arrived with garden centre plants from Europe so it is to be expected that some of these aliens will crawl across back fences of gardens surrounding Nonsuch Park. Slugs will need to feature in future Nonsuch field work.

Since 1993 and the natural establishment of a calcareous grassland community at Warren Farm, the Kentish snail *Monacha cantiana*, favouring a chalk-rich environment, is far more abundant and widespread in that part of Nonsuch and large numbers were seen crawling on the wet grass after rain during the British Naturalists' Association visit in July 2012 (Chatfield 2012b). It has also been seen in more-open patches of the North Plantation and London Road Plantation on entering the park from Wickham Avenue on 14 July 2013 so appears to be spreading in edge habitats. Similar wet field walks for Nonsuch Watch have revealed numerous colourful brown-lipped snails *Cepaea nemoralis* crawling up tree trunks in the boundary wood alongside Cheam Park. This is also a common snail on tree trunks at Morden Hall Park, south London. These large snails are eaten by thrushes and a thrush anvil of stone surrounded by broken shells of *Cepaea* and the common garden snail *Cornu aspersum* (=*Helix aspersa*) was found in April 2000.

Another introduction, the girdled snail *Hygromia cinctella*, after being confined to the west country for many years (Kerney 1999), started to spread in the 1990s. It has reached Juniper Hall Field Centre grounds, near Dorking, Surrey, and Jovita Kaunang has encountered it in various gardens in south London. *H. cinctella* has also been found in the garden of the South London Botanical Institute in Tulse Hill. It tends to occur in hedges on the edges of or within settlements rather than in open countryside. It is on the edge of Nonsuch as a colony was found in wet weather on guelder rose at The Spinney, London Road, North Cheam very close to Nonsuch in September 2013. It would be worth looking for it around car parks since there is the likelihood of it being transported under wheel arches of cars with girdled snails originating from the garden of the car owner. The two first records from Hampshire were found in car parks.

Whilst the terrestrial mollusc fauna has been comparatively stable, the freshwater fauna has shown more changes. The emergent waterside vegetation of the Balancing Pond (Newly Dug Pond of the 1994 paper) now thirty years old has a colony of Pfeiffer's amber snail *Oxyloma elegans*, while in the water an additional species was the ramshorn *Planorbis planorbis*, both recorded in May 2014. The ponds of Nonsuch were surveyed on 31 May 2014 and on this occasion molluscs were only found in the Balancing Pond although bladder snails were found in the Round Pond in 1993. They may have been transported on the feet or feathers of water birds flying in from other ponds.

Arachnids (spiders, harvestmen, pseudoscorpions)

Araneae, true spiders, is a group studied by relatively few people and there is no local arachnologist active in Nonsuch such that we needed to invite Tom Thomas from Bedfordshire to make a visit to augment the list started by the late Frances Murphy and Peter Harvey in 1993. Tom Thomas first came to Nonsuch in July 2012 to run a spider safari as part of the British Naturalists' Association AGM event in which he demonstrated methods of collecting and pointed out features in the spiders that were found. He was duly invited back for a specific spider recording day on 15 May 2013 in which we focused

attention on the northern perimeter tree belts, the newly coppiced area leading up to Cheam Park and The Wood, the latter now registered as Ancient Woodland by the Epsom and Ewell ecologist. In 1993 attention was focused on Warren Farm (then under threat from development) and Cherry Orchard Farm near the Ewell Gate car park. Spider survey days were in May of 1993 and 2013: twenty species were recorded in May 2013, half of which were additions to the previous list. Tom Thomas also joined a Nonsuch Watch and SLBI walk on 16 August 2014, recording then mostly from Warren Farm.

Most of the additional species (Table 6, page 141) were those of foliage obtained by beating lower branches of trees and shrubs. A wolf spider *Trochosa terricola* was found under a log by the Cheam Gate while other spiders like *Clubiona comta* inhabited spaces behind loose bark. Keeping standing dead wood and logs on the ground is to be encouraged as providing good habitats for spiders, particularly those like wolf spiders that do not make webs. As pointed out by Frances Murphy in 1993, grassland spiders are best in undisturbed places, a finding endorsed in a paper in *The London Naturalist* (Milner 1994). Milner considered the management implications for grassland spiders on Hampstead Heath in recommending as little disturbance as possible apart from controlling colonization by secondary woodland and limiting the increase in nutrients that leads to rank vegetation and reduced biodiversity. Spiders are carnivores and require suitable insects to feed on, so managing the habitat for spiders will promote insects too.

In summary, the total of Nonsuch spiders stands at fifty-nine species out of 650 on the British list so there is still much scope for future recording in a range of microhabitats from under logs, behind loose bark, in leaf litter and pitfall trapping, as well as beating trees and shrubs and sweep-netting in grassland. Going out into Nonsuch in early morning of misty autumn weather or in frosts in winter will highlight the distinctive webs of the various groups of spiders while providing areas in which to target fieldwork at the appropriate month for recording. *Philodromus albidus* is rather rare in the south and east but in recent years appears to be spreading northwards as so many other species of spiders and insects are too. The only indoor spider on the list was the daddy-long-legs spider *Pholcus phalangioides* found in the Mansion House toilets, but other species are likely to occur in cartsheds, outhouses, the Mansion House and Keepers' dwellings. Specialists need to be encouraged to Nonsuch to record the small money spiders or Linyphiidae that includes forty per cent of the British fauna. Tom Thomas comments that Nonsuch Park would repay visiting over the year as continuous recording will pay off for both spiders and harvestmen. Pitfall trapping would yield additional ground-living spiders.

No additional species records were made for harvestmen although Tom Thomas found *Rilaena triangularis* in the coppiced sycamore boundary wood in Nonsuch Park in May 2013. There are no further records for pseudoscorpions so further work on them is also needed in the future.

Insects

A useful resource available since 1994 is the Surrey Wildlife Trust series of Atlases showing distributions in the county at a tetrad level (2 × 2 km) together with some data on sites, including Nonsuch. They cover grasshoppers and crickets, dragonflies, shield bugs, butterflies (two editions), large and smaller moths, hoverflies, ants, wasps, bees, ladybirds, water beetles and water bugs, providing historical and current information with much useful interpretation.

There is also a county checklist of beetles. Since 1993 there have been two very useful photographic general field guides to insects, *Collins Complete Guide to British Insects* (Chinery 2005) and *A Comprehensive Guide to Insects of Britain & Ireland* (Brock 2014). There are more species of insects than any other animal group and entomologists tend to specialize in single families, so coverage of the families is patchy according to the interests of the recorders taking part. New records come from the usual field workers from their own collecting and some incidental recording during goldenrod pulling sessions that has people in the field in one place for long periods. There have also been field meetings of the LNHS, British Entomological and Natural History Society (BENHS), Conchological Society of Great Britain and Ireland, and Nonsuch Watch (about three each year), that have generated records often published in respective newsletters. Roger Hawkins was commissioned by Nonsuch Watch in 2004 to undertake a grassland insect survey to assess the benefits from meadow management. He did find a difference: 'The most remarkable change since 1993 is to the grassland within Nonsuch Park itself. At that time most of the grass was kept short through regular mowing and was almost devoid of wildlife. Nowadays many of the fields with their grassland flowers are allowed to grow long for much of the year, except on paths. The variety and quality of insect life using the fields now rivals the best parts of Warren Farm and must resemble the condition of the countryside before chemical farming and the use of machines.'

As well as filling in gaps of species missed before there has been a raft of genuine new arrivals from the Continent, perhaps reflecting warmer conditions and also the warm microclimate of London and the Thames valley. Noteworthy examples often featuring in the media include horse-chestnut leaf-miner *Camarella ochridense*, tree bumblebee *Bombus hypnorum*, ivy bee *Colletes hederae*, bryony ladybird *Epilachna argus* and harlequin ladybird *Harmonia axyrida*.

Additional records of insects are listed in Tables 7, page 142 (butterflies and moths) and 8, page 147 (other orders).

Lepidoptera – butterflies

There is a modest number of species of British butterflies and an active national society, Butterfly Conservation, is involved in studying this popular group. For some time I had been hoping that a local member would undertake butterfly transects in Nonsuch, and in 2013 Peter Camber, also a member of Nonsuch Watch, has taken this on. He recorded twenty-two and twenty-five species at Warren Farm in 2013 and 2014 respectively. The transect methodology provides a monthly count along a standard route in weather suitable for butterflies to be on the wing and is a useful monitoring tool for population change. The results give monthly and annual counts for each species recorded along a transect and show the duration of the flight period for each butterfly. If a short flight period coincides with wet or cold weather this impacts adversely on breeding success making some species particularly vulnerable. As in 1993 in Nonsuch there is a strong component of grassland butterflies in which the caterpillars feed on grass: these include small/Essex and large skippers, meadow brown, gatekeeper, ringlet and marbled white. It is good to report a healthy population of marbled white *Melanargia galathea*, one of the declining species of chalk grassland nationally, but there seems to be an upward trend in more recent years (Fox et al. 2006): this has a short flight period from June to early August. Traditionally a butterfly of chalk downland, marbled white has in recent years taken residence in suitable roadside grass of central reservations and

roundabouts on the chalk at Alton in Hampshire (Chatfield 2013) and has colonized the new calcareous grassland habitat naturally developed at Warren Farm since arable agriculture ceased. Marbled white was not recorded at Nonsuch in 1993, but not only has it established good numbers at Warren Farm, it is now (2014) seen in the summer meadows of Nonsuch Park on the Thanet Sand nectaring on common knapweed and other flowers. In spite of its colour and English name, marbled white belongs to the browns. Additional records of butterflies (and moths) are listed in Table 7.

The star feature of Warren Farm butterflies today is the breeding population of small blue *Cupido minimus* that has established associated with good patches of its larval food plant horseshoe vetch in the south-facing Sleepy Field, initially spotted by Jovita Kaunang. Small blue was on the wing from May until early July with fourteen and twenty-five individuals in 2013 and 2014 respectively in Peter Camber's transect data. This is another chalk grassland specialist and our smallest British butterfly, and it is good to have it in Nonsuch. However it depends on kidney vetch for egg-laying and as a food plant for the caterpillars and that only occurs at Warren Farm, so small blue will continue to be local within Nonsuch. Small blue favours the sunny south-facing slope of Sleepy Field and has benefited from the clearance of the Canadian golden rod in that area as it prefers a shorter sward. A second blue butterfly at Warren Farm not recorded to 1993 is the brown argus *Plebeius agestis*, a south-eastern butterfly of calcareous grassland, but although once associated with common rock-rose (that does not grow on Warren Farm) it can use a wider variety of larval food plants like the common dove's-foot and cut-leaved crane's-bill. Like other blues its mature larvae are attended by ants.

After a period of severe decline it is good to report that the once common nettle-breeding small tortoiseshell *Aglais urticae* is now recovering from its late-twentieth-century decline and is appearing again at Nonsuch and elsewhere. Thirty-five were counted in the transect data for 2014. Previously ubiquitous and common, its numbers fluctuated downwards and this may be due to parasites as the larval food plant, the stinging nettle, is common everywhere and butterfly bush and other flowers easily available for nectar.

Two uncommon butterflies, the brown and white-letter hairstreaks *Thecla betulae* and *Satyrium w-album* respectively, are holding on in low numbers at Warren Farm, the former on blackthorn and the latter on elm. Brown hairstreak has a limited and patchy distribution in Britain with a south-western bias but it is declining nationally (Fox et al. 2006) and in the first edition of *Butterflies of Surrey* (Collins 1995) it was not known in the north of the county. It breeds on blackthorn and can be recorded from its distinctive, attractive but tiny white eggs on the twigs in winter. White-letter hairstreak is also a declining species but has a wider distribution over much of England and the Welsh borderland. As it breeds on elm it was disadvantaged in Nonsuch and elsewhere following the Dutch elm disease outbreak of the 1970s but there could be other factors involved. Scrub elm clones sprouting from old rootstock but not developing into mature trees are being used to sustain white-letter hairstreaks at Warren Farm, Nonsuch by Nonsuch High School. Laying eggs in hedgerows and trees these two hairstreaks as adults are elusive and have a short flight season of August to September for brown hairstreak and July to August for white-letter hairstreak. In August 1993 Roger Hawkins recorded the purple hairstreak around oak trees by the London Road. This butterfly, as it is on the wing above the canopies of oak trees, unless rain washes one to ground level, is

under-recorded. Visitors to Nonsuch in July and August are advised to scan the top canopies of oak trees with binoculars, especially parkland trees in the open, to see it on the wing. Nonsuch Park with its mature oaks is a potentially good habitat for this butterfly.

Butterfly numbers vary greatly from year to year due to weather, with the short flight periods particularly affected by inclement conditions during breeding time. Some also show cyclical hymenopteran parasite infections causing fluctuations in numbers. The sunny open aspect of Warren Farm and abundant flower nectar source for adults coupled with suitable larval food plants makes this area a good butterfly habitat. Natural succession of vegetation from abandoned arable land to flower-rich chalk grassland has benefited the butterfly fauna, particularly those of chalk grassland that do not occur so much in the rest of Nonsuch Park.

Lepidoptera – moths

Only eight species of daytime moths were recorded during the 1993 survey as incidental records. As moths are largely nocturnal it is necessary to run light traps, ideally over a range of months to reflect the seasonal occurrence of many of the species. This involves field work in antisocial hours and permission to run the traps. Nonsuch Watch was fortunate in having some moth surveys done by Paul Wheeler assisted by Richard Donovan that has greatly added to the list. The traps were positioned near the Cheam Gate, The Avenue, outside the Mansion House gardens and the entrance to Warren Farm, all in the same monad TQ/26-63, and run in November 2005 and July to September 2006. This resulted in records of sixty-three species of larger moths and eighty-nine species of micromoths, including leaf-mine records (see list of additional species, Table 7). They included four Nationally Notable moths and some Surrey Notables. Published atlases for moths are *Larger Moths of the London Area* (Plant 1993) and *Larger Moths of Surrey* (Collins 1997) which give tetrad maps of species, but more will have been recorded since then due to recent increased popularity of the subject. *Smaller Moths of Surrey* (Palmer et al. 2012) has covered the micromoths and this gives clues to species that could be found at Nonsuch in addition to those recorded by Paul Wheeler in 2005 and 2006 from light-traps and leaf mines. There is also a good field guide to micromoths (Sterling and Parsons 2012) that will encourage more records of micromoths both as adults, caterpillars and leaf mines in the future.

In the last twenty years there have been many new moths arriving in Britain and increasing their range northwards. A very conspicuous arrival from its extensive brown leaf mines is the horse-chestnut leaf-miner *Cameraria ohridella* that does not require an entomologist to spot. It was first discovered in Britain from Wimbledon, south London in 2002 (Palmer et al. 2012). Roger Hawkins pointed it out on a horse-chestnut tree by the entrance to the Cheam Gate on a walk he was leading for Nonsuch Watch in July 2005: the foliage on the tree was then completely brown and the leaves shrivelled but that tree is still alive and well. Horse-chestnut leaf miner is now found throughout Nonsuch on white horse-chestnut of which there are many avenue trees as well as self-sown saplings in the wooded surround, and it develops on these too. From Wimbledon in 2002 it has colonized Surrey, except on heathland where horse-chestnuts do not grow, and has spread throughout England and Wales (Brock 2014). It is however receiving some natural control from parasitic insects that are now discovering it. More work is needed with further light trapping,

recording of day-flying species, caterpillars, and also recording micromoths from leaf mines. It is an interesting group of insects that reflects environmental conditions and changes.

Orthoptera – grasshoppers and crickets

This group was soon covered by the Surrey Wildlife Trust atlases in *Grasshoppers and crickets of Surrey* by David Baldoock (1999). Nationally-expanding species of long-winged conehead *Conocephalus discolor* and Roesel's bush-cricket *Metrioptera roeselii* had already reached Nonsuch by 1993 and there are no further changes to report. It will be interesting to know whether the common green grasshopper *Omocestus viridulus*, not found in the 1993 surveys, will come to Nonsuch now that the grassland management has changed.

Hemiptera – shieldbugs and leatherbugs

Shieldbugs were well covered in the 1993 field work at Nonsuch as Roger Hawkins (2003) was gathering material for his *Shieldbugs of Surrey* and Nonsuch Park features in the gazetteer of sites. In 1993 he had already found the formerly rare juniper shieldbug *Cyphostethus tristriatus* that was once only known from juniper bushes on the North Downs. At some stage the insect discovered cypresses and began to feed on them and this enabled it to colonize most of the county by 2003. It was particularly strong in the north-east suburban areas with records in every tetrad of TQ/26 that covers Nonsuch. The author found the juniper shieldbug in Haslemere, west Surrey and in Alton, east Hampshire in 2014 so its spread continues. The author has been able to add the forest bug *Pentatoma rufipes*, found on the pavement along the London Road Plantation. It is likely that the once-rare RDB1 leatherbug, the box bug *Gonocerus acuteangulatus*, will be found in Nonsuch in the near future. In 1989–1996 it was confined to the Box Hill area of Surrey, but by 2003 had spread across the county, again enabled by extending its range of food plants (Hawkins 2003). The box bug is now in Hampshire too, found as a last-instar nymph by the author in her garden in Alton, reared to adult stage and released, and also by John Glasgow in Winchester as an adult, both in 2014, another former rare species spreading outside of Surrey.

Diptera – two-winged flies

This is a very large group of insects with over 7,000 British species so must be under-recorded at Nonsuch and specialist help is needed. Hoverflies, one of the more popular families of Diptera, had good coverage in the 1993 surveys since several of the insect recorders took an interest in them and hoverflies was one of the early issues of the Surrey atlases (Morris 1998). Mick Massie recorded *Myanthropa florea* by the Brown Pond on an LNHS field meeting, a species found before in the 1993 surveys. Its larvae develop in water-containing rot-holes of trees, so oaks in the Brown Pond copse would have provided a breeding site. Vic Howard, who contributed to hoverfly recording in 1993, provided the record for the large hornet hoverfly *Volucella zonaria* (Figure 18) at Nonsuch Park in 1984 although we did not see it in 1993: it only established in Britain in 1940 (Brock 2014). Morris (1998) records the expansion of this scarce hoverfly in the suburbs of north-east Surrey and refers to observations by Danks (1963) writing from Surbiton, not far from Nonsuch, who stated that *V. zonaria* was 'extremely common and appears more abundantly each



FIGURE 18. Hornet hoverfly *Volucella zonaria* by the London Road.

year'. The author was at Imperial College, London with the late Hugh Danks who was a very keen entomologist and she remembers him busy checking proofs for the Amateur Entomologists' Society whilst travelling in on the Underground to South Kensington. The hornet hoverfly was not common everywhere: it is shown as local in north-east Surrey in the tetrad maps and the annual list of records given shows fluctuations with peaks in 1945–1949, 1960–1964 when Hugh Danks recorded it, 1980–1987 when Vic Howard recorded it, 1989, 1991, 1993 and 1997. It was not found everywhere in the range in the good years as it was not seen in Nonsuch Park in 1993, and Hughes (1964) reported only a single sighting in the Croydon area. By 1998 it had not moved out of the orbit of London and the built-up area and seemed to favour its warm microclimate and was reported entering buildings. A fine specimen was seen and photographed resting on a leaf in the wooded belt along the London Road, North Cheam between Palmer Avenue and Wickham Avenue by John Glasgow and the author when en route to a Nonsuch Watch field meeting in 2013.

A scorpionfly *Panorpa* cf. *germanica* with an upturned red tail and black markings on the wings was beaten out of shrubby foliage in the coppiced woodland area at Nonsuch Park in May 2013 when collecting spiders with Tom Thomas. It was duly photographed and released. Although there are only three British species of scorpionflies certain identification to species depends on dissection of the genitalia.

Hymenoptera – bees, wasps, ants

There have been two new species of bee arriving naturally in the British Isles from the Continent and both have been seen at Nonsuch. The tree bumblebee *Bombus hypnorum* is easily recognized from its orange thorax, black abdomen with white tail and the markings are the same for both sexes and the workers,

but the queens on the wing in spring are larger. It is a new-millennium insect being first seen in the Southampton area in 2001 whence it spread along the south coast and then inland. The author had it in her garden in Alton, Hampshire in 2009 and each year since. Baldock (2008) showed only a thin scatter of records in Surrey with a cluster in the extreme north-east of the county but nothing for the Nonsuch 10-km square TQ/26, and the first Surrey record from Egham was in 2004. The author recorded it in Nonsuch Park in a sunny patch on the path through North Plantation approaching The Wood in 2012. The second new bee is the ivy bee *Colletes hederae* with the first British record in Dorset in 2000, which then spread along the south coast before making its way inland. Baldock (2008) was able to include it in *Bees of Surrey* but there was only one record from Reigate in October 2007. This small bee is distinctive in its habits for it is around late in the season when it feeds on nectar-rich ivy flowers in sunny places. It is in only the more recent field guides as the species was not described until 1993, but is in Brock (2014) together with a map showing that it is still strongly southern south of the Thames but there is a scatter of records north along the Welsh borderland. It was first recorded at Warren Farm, Nonsuch by Graham Collins in September 2012 on ivy flowers between the footpath and Sleepy Field and was also quite numerous in 2013. The ivy bee has been seen by the author and Heather Tait in flowering ivy in a south-facing sunny position at the edge of a field above Huntsmead in Alton, Hampshire in 2013. The Bees, Wasps and Ants Recording Scheme (BWARS) website shows the up-to-date evolving situation with these two new bees. Other additional bees are shown in the table of additional species. Wasps seen at Nonsuch, apart from common wasps around the outside tea tables in late summer in search of jam on scones, tend to be small and overlooked. The tiny parasitic Hymenoptera that are prevalent in butterflies and moths are a specialized study that could usefully be explored at Nonsuch particularly the effects on the population dynamics of their host species. Other small wasps are the gall wasps with which most people are familiar in the form of plant galls. A special study of cecidology is in the next section.

As acknowledged in *Ants of Surrey* (Pontin 2005), Surrey is a good county for ants having thirty out of the forty-two native species, but it is under-recorded since there are few entomologists in the area studying them. The maps for the Nonsuch tetrad show most of the species that we recorded in 1994 but *Myrmica rubra*, *Formica cunicularia* and *Stenamma* sp. found by Peter Harvey and Brian Fox are new. Nonsuch lacks the heathland habitat that holds the rarest ants so it does have limited potential for this group. Pontin says: 'Recreational impact near human populations is progressively fatal to natural history', and regarding ants: 'At the very least, one might expect *Lasius niger*, *L. flavus*, *L. brunneus*, *F. fusca*, *M. ruginodis*, *M. scabrinodis* and *L. nylanderi* to persist, with gardens and parks as the remaining preserved habitats, but this is surely a dismal future!'

Coleoptera – beetles

After Diptera and Hymenoptera, each with over 7,000 British species, Coleoptera is the next largest order with over 4,000 species of which 3,005 occur in Surrey (Denton 2005). They are under-recorded as people interested in beetles tend to specialize in a single family and some large families like the rove beetles (Staphylinidae) are notoriously difficult. Denton's map with numbers of beetle species per tetrad shows TQ/26 as one of the least well-

recorded 10-km grid squares in Surrey. However ladybirds (Hawkins 2000) and water beetles (Denton 2007) are covered in the Surrey Atlas series. About sixty species were listed in the previous Nonsuch paper. Ladybirds have been the most intensively studied as some of the research by Roger Hawkins for his *Ladybirds of Surrey* was undertaken at Nonsuch and that group was well covered in 1993. He regarded Nonsuch as one of the best places in Surrey for ladybirds. Conspicuous by its absence from the 1993 list, and Hawkins (2000), is the alien harlequin ladybird *Harmonia axyrida*, a Japanese species used on the Continent for biological control of insect pests in greenhouses. Some evidently escaped and crossed the North Sea to arrive in East Anglia in 2002 and it soon spread westwards and become abundant in London where the melanic morph (red spots on a black background) was prevalent. It is a large ladybird, slightly larger than our native seven-spot ladybird, and is confusing because of the great variety of polymorphic forms, but has orange legs instead of black and a different colour pattern of orange on black on the underside. The first one, an adult, was found at Nonsuch near the Cheam Gate during a field meeting on 8 October 2006 and again was seen as the larval stage on the trunk of parkland trees (oak and sycamore) in Round Pond Field near the Mansion House. It has now spread throughout Nonsuch and was numerous around the Balancing Pond during a visit on 31 May 2014. It hibernates over winter, can congregate in houses and cars and seems to outbreed our native species by having more than one generation. Roger Hawkins added a new species of small ladybird *Nephus quadrimaculata*, found on Warren Farm. It appears that the once very common two-spot ladybird *Adalia bipunctata*, the normal ladybird in London, is now much reduced in numbers due, it is suggested, to predation by the alien harlequin ladybird.

Water beetles were included in one of the Surrey atlas books (Denton 2007), but Nonsuch Park was not listed in the gazetteer of sites. The tetrad maps shows over fifty species occurring in the 10-km square TQ/26 so recording needs to be done in Nonsuch where water beetles are regularly seen in the ponds but not yet identified. Incidental to looking for molluscs on a field meeting on 28 April 2007, Pam Wilsom recorded two water beetles, the hydrophilid *Anacaena lutescens* and the dytiscid diving beetle *Hydroporus angustatus*, in the Balancing Pond, the latter being a new record for TQ/26.

A number of additional beetles came from Warren Farm on an entomological (BENHS) field meeting on 16 May 1998: this produced the greater stag beetle *Lucanus cervus* that I have always known from Nonsuch, but as it spends several years as a larva feeding on wood inside logs and only emerges for a short time as an adult in hot weather in midsummer it is often missed. The greater stag beetle is a southern species with the focus of its range being London and the Thames valley. The lesser stag beetle *Dorcas parallelipipedus* also occurs at Nonsuch. Other finds from this meeting were three species of weevil listed in the table, two leaf beetles with *Chrysolina oricalcia* on umbellifers and *Galeruca tanaceti* on various grassland plants. A striking yellow-and-black insect was the wasp beetle *Clytus arietus*. False blister beetles, the swollen-thigh beetle *Oedomera nobilis*, with the enlarged thighs denoting a male, was a striking and distinctive beetle found on flowers of ox-eye daisy on Warren Farm on 5 June 2005. The adults feed on pollen while the larvae live in hollow plant stems. Click beetles have been found from time to time around the banqueting house site and a rare one, *Ischnodes sanguinicollis*, was found in a log in this area in 1995 and reared to an adult: it has a red thorax

and black body. The striking golden-bloomed grey longhorn beetle *Agapanthia villovirodescens* was found on hogweed on Cherry Orchard Farm in June 2012 reported by Jovita Kaunang. It is a species of eastern and central England but very local in Surrey (Brock 2014): the adults visit flowers while the larvae develop in stem tissue of hogweed and thistles. It may be extending its range as the author found one in Margam Park, Port Talbot in south Wales in May 2013. Whilst using a beating tray for spiders some hazel nut weevils *Curculio nucum* were found in The Wood, also in May 2013. Further details of these finds are given in Table 8. Much remains for entomologists in the future to monitor and discover and locally based recorders are more than welcome.

Plant galls

There has been considerable advance in the study of plant galls (cecidology) in the last twenty years aided by two editions of a Field Studies Council identification chart (Redfern et al. 2011), a popular photo-illustrated field guide (Chinery 2011), and an in-depth summary of gall biology and research in *Plant Galls* in the New Naturalist series (Redfern 2011). The study is also supported by the British Plant Gall Society.

Eighteen species of galls were listed in 1993 (Chatfield 1994) and some probable recording gaps of common species have been filled, but there has been a wave of genuine new arrivals, not just to Nonsuch and the Thames valley but to the British Isles. This started at the end of the 1990s. Jovita Kaunang was the first to report ram's-horn gall *Andricus aries* on oak buds in Nonsuch Park and the author has seen and photographed them on subsequent occasions to date. Ram's-horn gall was first found in England in the Thames valley in 1997 and has spread. Two other new arrivals on oak are the hedgehog galls *A. lucidus* and *A. grossulariae* that deform the cups of pedunculate or English oak in their asexual summer generations. The sexual generation of *A. grossulariae* forms blackcurrant-like galls on the male catkins of Turkey oak in spring. With Turkey oak as part of the original planting in the northern part of the Oak Plantation in the centre of Nonsuch and saplings establishing in the woodland belts, this life cycle is well provided for at Nonsuch. *A. grossulariae* was first found in Berkshire in 2000 and has spread through the Thames valley including London, and the author first encountered it in a churchyard in Streatham, south London in 2008 as the blackcurrant galls of the sexual generation when on field work with the South London Botanical Institute.

An interesting new find in 2014 at Nonsuch Park was the pocket plum *Taphrina pruni* on blackthorn near the Sparrow Farm Road gate. This causes the destruction of the hard stone inside the sloe so pocket plums are hollow inside, hence their English name. Margaret Redfern (2011) refers to great variation in their numbers from year to year. The new species of galls (Table 9, page 149) arrived subsequent to the first Nonsuch paper in *The London Naturalist* (Chatfield 1994). At that time eighteen species of galls had been listed and these continue to occur at Nonsuch but their abundance varies. Some years the oak leaves are heavily encrusted with common spangle and silk button galls while other years they are scarce. Galls make an interesting phenological study with peaks of different species coming in spring and late summer but with the woody ones remaining on the host plant through the winter long after their gall organism has matured leaving an exit hole as we saw on a Nonsuch Watch walk in April 2013 with the old bladder galls of *Eriosoma lanuginosum* on elm that is normally green but black when old. Serious

cecidologists breed out the gall-causing insect or mite. Some galls are occupied by more than one individual and show several exit holes: it is interesting to cut an old robin's pincushion in half to see the various chambers. The spring galls include the currant galls on oak catkins and the large green red-flushed oak apples of *Biorhiza pallida* that are the sexual generation of their species, while the late summer generation of galls on oak are asexual. Galls are most easily seen on trees and bushes, but a whole range of species form also on herbaceous plants, and these await investigation in future fieldwork at Nonsuch.

Amphibians and reptiles (frogs, toads, newts, slow-worms, lizards)

With relatively few species and active recording, *Amphibians and Reptiles of Surrey* (Wycherley and Anstis 2001) gives an overview of the state of these animals in the county. The amphibians have aquatic larvae and they all require standing water, either as ponds in the park or in the surrounding gardens. It is unlikely that the ditches in Nonsuch hold water long enough to see the aquatic stage through to metamorphosis. Frogs *Rana temporaria* and toads *Bufo bufo* continue to be found around Nonsuch Park, often seen hidden under logs in woods or disturbed from wet grass. Tadpoles of both are to be found in the Balancing Pond in spring. The toad tadpoles are an intense black, lacking the golden flecks of the frog tadpoles and the two also differ in their behaviour with toad tadpoles more likely to be swimming in full view in open water while the frog tadpoles shelter out of sight in the pond weeds. Apparently the toad tadpoles have a bad taste (not that I have tried them!) from glands in their skin, rather like poison-arrow frogs of South America, that acts as a deterrent from predators so there is less need to hide. There is however no biological classification difference between frogs and toads: in Britain the word 'toad' refers to those with a dry warty skin and the word 'frog' to a smooth moist skin. Common or smooth newts also depend on ponds during the breeding season as they too have aquatic larval stages. Juvenile and adult newts are also found under logs in wet woods like the London Road Plantation that is not far from the Balancing Pond, their main breeding site now in Nonsuch. Most newts at Nonsuch are common or smooth newts *Triturus vulgaris* but great crested newts *Triturus cristatus* have long been known to live in Nonsuch.

In April 1997, Nonsuch Watch commissioned Keith Andree of Surrey Amphibian Group to search the ponds of Nonsuch in the hope of confirming the continued presence of great crested newts that the author remembered from the Brown Pond near Sparrow Farm Road in the 1950s. The Balancing Pond by the Ewell Gate, Nonsuch Park's largest pond, but also the newest being dug only in 1984, provided a large area of open water and plenty of weed and cover. In April 1997 this yielded an abundance of common newts that had gone to the pond to mate and lay eggs, but no great crested newts were found there. However, the Round Pond near the Mansion House is a smaller but historic pond dating back at least to the eighteenth century from the field name and this did produce great crested newts. In the daytime this newt hides away on the bottom in deep water so thigh waders and a long-handed net were needed to get them. Today a licence from Natural England is needed to handle great crested newts. The author and Frances Wright were with Keith Andree on this visit. The Round Pond water level varies greatly from time to time from filling the hollow to completely drying out exposing bare mud, but great

crested newts only need it for the spring breeding season. The Brown Pond, where the great crested newts were once found, is now very intermittent and dry for much of the year and is also more shaded with denser growth of trees in the copse, however, it should be checked in future should the pond be full of water during the breeding season.

Great crested newts are protected under the Wildlife and Countryside Act 1981 and planning applications in the vicinity of a great crested newt site need to consider them in the plans. Consultants' surveys for wildlife connected with a planning application at Nonsuch High School this year (2014) were online for the consultation period and recorded common newts in the school's wildlife pond. Their desk surveys picked up other reports of great crested newts in Nonsuch Park. Whilst ponds are needed for breeding, the newts leave the water after this and will seek out logs in damp places in the vicinity of the pond as refuges. There is also the possibility that suitable ponds in gardens backing on to Nonsuch will be breeding sites for common newts, and may be if deep enough, for great crested newts also. During the breeding season great crested newts are more likely to be seen in ponds swimming in open water about dusk.

Common lizards *Lacerta vivipara* (Figure 19) and slow-worms *Anguis fragilis* continue to live at Nonsuch but in limited areas of Warren Farm, the railway embankment and the Nursery site near the Ewell Gate. Railway lines and banks form a splendid network of connected habitat for slow-worms and common lizards across the built-up areas of London. They are most likely to be seen in early summer mornings sunbathing on bare soil or dry dead vegetation that is warmer than fresh green vegetation as they need to warm up before feeding. Janet Gilbert reported seeing a common lizard basking on an anthill at Warren Farm on 23 August 2000 (Gilbert 2001) and a grass snake *Natrix*



FIGURE 19. Common lizard at Warren Farm.

Photo: Jovita Kaunang

natrix was seen at Warren Farm near the railway line in 2001 with the comment 'first seen since the 1960s': both of these sightings were reported in *Nonsuch Watch Newsletter*. At the beginning and end of season reptiles will congregate under sheets of carpet tiles or corrugated iron and this is the method used by consultants in surveying for them by putting refuges on site for checking over the next few weeks. Appearance at the refuges is weather and microhabitat dependent and as reptiles hibernate over winter a negative result in a short snapshot of survey time does not necessarily mean they do not occur on the site and a repeat survey may be recommended by the consultant if the habitat looks suitable. A reptile survey of the Nursery site commissioned by Nonsuch Watch was done by John Poland before it was incorporated into part of Nonsuch with public access being a walk-through path, and in this survey slow-worms and common lizards were found using rubble heaps as refuges which were then left after clearing dangerous materials like broken glass.

Birds

Since 1994 tetrad maps of birds have been published in *The Breeding Birds of the London Area* (Hewlett 2002) and *Birds of Surrey* (Wheatley 2007) that both include Nonsuch in grid square TQ/26. These books give a broader account of trends for each species in London and Surrey, putting Nonsuch bird life in context. There have been various reports on bird life each year in the *Nonsuch Watch Newsletter* and particularly regular bird reports by Harry Nicholson, who also led bird walks, and more recently by Beryl Trott, both of whom live in the area and visit Nonsuch regularly. As expected there have been a number of changes to the avifauna of Nonsuch: some of these are due to changes in habitat, land use, climatic and weather factors. There are new additions to the list of 1993 in which species have either extended their range or been introduced or escaped from captivity and then naturalized.

Final loss of agriculture from Nonsuch with the end of arable use of Warren Farm and replacement by amenity land use had by 1993 already brought about the loss of partridges, rooks and cuckoos (apart from on passage) but also reduced the range and numbers of skylarks (Chatfield 2014b). Whilst Warren Farm was mostly saved from building development and went to The Woodland Trust under a Schedule 106 agreement, the increased access of people and dogs has not been favourable to the skylarks that are ground-nesting birds and easily disturbed, a parallel of the situation already reported for Wimbledon Common (Hewlett 2002), as well as following national trends. In an arable situation of cereal-growing the skylarks find protection for their nests amongst the mature crop that also provides an obstacle that deters the entry of humans and dogs, at least in the centre of the field. Other formerly common Nonsuch birds now in decline include, surprisingly, starlings and house sparrows whose populations collapsed from the 1990s also following a national trend. All three species are now on the Red List. The crucial factor in house sparrow populations in urban areas appears to be lack of invertebrates as food for the young (Reast 2012, Chatfield 2014a) and research is ongoing. Other species persist but in reduced numbers. These population changes hint at the complex web of conditions necessary for a species to thrive and complete its life cycle on a regular basis and the effect when a vital element is removed.

In contrast, there have been some recoveries of populations as well as additional species coming into Nonsuch. For the London area generally there have been greater numbers of great tits, robins, jackdaws and great spotted

woodpeckers, probably due to garden feeders, and also increases in blackcaps, recovery of whitethroats from the 1960s crash, and some migrant warblers like chiffchaff overwintering here instead of migrating. As well as the traditional migrations of normal winter and summer visitors there is considerable shifting around of populations of birds after the breeding season when they are no longer confined to nesting sites and can seek more plentiful food elsewhere. This may have a climatic or weather cause (Anon. 2013). The alien species coming in are not always welcome as they increase in numbers and compete with native birds for nesting sites. Predatory birds or raptors are recovering their populations from the mid-twentieth-century decline so sparrowhawks are now back and breeding in Nonsuch, kestrels perhaps are less abundant but merlin and red kite have been seen flying over. Small birds are put under stress on sight of hawks so need adequate bush cover where they can hide. Hawks however are part of the natural avifauna and they need to eat too. The carrion crow (Figure 20) is the dominant corvid at Nonsuch.

Other passage migrants seen since 1994 include whinchat and wheatear, while Beryl Trott has seen stonechat at Warren Farm, and Canada geese have flown over and are established breeding in Ewell at Bourne Hall lake, but the Balancing Pond at Nonsuch has insufficient open water to attract them because of the colonization by reed-mace *Typha*. However, the alien species that has naturalized at Nonsuch in a conspicuous way since 1994 is the ring-necked parakeet. Harry Nicholson first spotted them (just two) on 15 January 1998. They established a breeding colony in The Wood from which they radiated across the park drawing attention to their presence by their noisy calls and small flocks of bright green birds with long pointed tails. The fear is that



FIGURE 20. Carrion crow in the Mansion House garden. Now the dominant corvid in Nonsuch, this one has some patches of white feathers.

they are competing with native species for holes in mature and old trees for nesting. They are now widespread across London and into Surrey where the author has seen them in Ewell, Ashtead and Juniper Hall, Mickleham in the last ten years.

Birds at Nonsuch fit into various categories, those that are resident and breeding all year, summer visitors coming to breed, winter visitors coming to feed and overwinter, and others on passage flying over or perhaps breaking a journey for a few days to feed up and rest. The last provides some opportunistic and interesting sightings for birdwatchers. Within its limits Nonsuch continues to be a good place to watch birds and learn about them.

Mammals

This is a group where targeted fieldwork using Longworth mammal traps needs to be done as dead specimens are rarely found while the live animals are usually nocturnal and elusive. A dead common shrew *Sorex araneus* (Figure 21), found and photographed on the path at Warren Farm on a Nonsuch Watch walk, is new to the previous list. Hedgehogs *Erinaceus europaeus* are only normally active at dusk but roadside corpses are rarely found in the Nonsuch area reflecting low densities of this popular mammal that is often associated with suburban gardens. Mole *Talpa europaea* hills are still numerous in Nonsuch on the Thanet Sand along the Avenue between the Ewell and Cheam Gates and around the Banqueting House site. Here humus from fallen leaves, shade and moisture is likely to promote the earthworms that moles feed on. As they live underground in tunnels the animals themselves are rarely seen alive or dead. They tend to avoid the London Clay. Brown hares and rabbits no longer occur in Nonsuch with the encroachment of suburbia.



FIGURE 21. Common shrew found dead on a path at Warren Farm.

Bats are still seen around Nonsuch at dusk. Great advances have been made in their study since 1993 with use of bat detectors, ability to record the sounds of echolocation and to use computer programmes for more accurate identification of their calls. As bats and their roosts are protected by law, many planning applications that involve demolition or extensive work on buildings in which they might live or to trees likely to be roosting sites have to submit bat surveys with the planning applications. During the consultation period these are generally available online through Epsom and Ewell's planning portal. Bat surveys also cover the behaviour of bats to establish whether their regular transport routes and feeding strategies would be likely to be adversely affected by the proposed development. The continued presence of pipistrelle *Pipistrellus pipistrellus* and noctule *Nyctalus noctula* has been confirmed in a survey commissioned by Nonsuch Watch and one linked with a planning application at Nonsuch High School. To this list is added Leisler's bat *Nyctalus leisleri*.

Foxes *Vulpes vulpes* frequent Nonsuch Park as well as gardens in Ewell and Cheam. A fox skull was found on Cherry Orchard Farm and the author had a good view of a live fox during a morning visit to the Balancing Pond prior to a Nonsuch Watch walk.

Pond life

Ponds are usually man-made, either with a functional purpose as watering places for grazing animals, amenity or flood defence as balancing ponds, or a by-product of another activity such as clay pits or bomb craters. The Round Pond was probably originally a watering place, perhaps for the deer herd of Nonsuch Palace, the Brown Pond is associated with field drainage while the Balancing Pond of 1984 is for flood defence. Ponds are transient habitats with seasonal variations in water levels and can be dry for several months while a steady process of siltation and ecological succession of plants progresses a pond from open water to a marsh or wet woodland, the process known as a hydrosere. Underlying geology provides the impervious layer necessary for a pond to exist, the soil and subsoil affect its chemical nature and the local hydrology its water supply, particularly the balance between surface run-off, rain and groundwater input.

Three ponds that I remember at Nonsuch over half a century ago, two bomb craters and the old Bluegates clay pit, no longer exist. The oldest pond in Nonsuch is the Round Pond with map evidence taking it back to at least 1731 (Dent 1981). The mud surround is somewhat acidic with a pH of 5.5 measured by BDH indicator on 30 May 2005. In the 1950s it was in an open situation circled by rushes *Juncus* with a few trees on the south side, presumably the younger versions of the white poplar there today that have grown and suckered, so that there was an open view of the park to the north. On occasion it would be green with duckweed, and still is from time to time, including the photograph taken in the previous Nonsuch paper (Chatfield 1994). It was not known as a habitat with much pond life. However, it was confirmed in 1995 as a place for great crested newt found in the deeper water at the centre. In recent years dogs have been swimming in this pond fetching sticks thrown by their owners. How might this impact on the great crested newts? In 2008 the surface of the Round Pond was completely covered with the alien water fern *Azolla filiculoides* probably brought in on the feet of birds visiting the pond. Following experience of other situations it rapidly covered the pond, turned crimson in autumn and then disappeared. The water level in

the Round Pond varies with season and can be reduced to just wet mud when marsh foxtail grass, trifid bur-marigold and marsh cudweed germinated and flowered. On occasion in shallow water the pond water-crowfoot has appeared and flowered so releasing seeds onto the mud to germinate next time that conditions are right. Now surrounded by trees the Round Pond is shaded and the water coloured brown from tannin leaching out of fallen leaves on the bottom. At the eastern end is a clearing letting some light in and here there is a sandy edge of Thanet Sand with some flints, possibly from the Bullhead Beds (see page 87) that could be the impervious layer enabling a pond to exist here. When visited on 31 May 2014 no aquatic plants were in evidence and dipping revealed reddish water fleas *Daphnia* to be the dominant life form with occasional copepods *Cyclops* with the females carrying paired egg sacs. True to its name *Cyclops* has a single central eyespot. There were also some small red oligochaete worms, a few small pond shrimps *Crangonyx*, another introduced species, and pupal stages of mosquitoes. The self-sown willows to the north of the pond have many leaning and horizontal branches and are providing an interesting habitat for epiphytic bryophytes and lichens.

Three small ponds in oak copses, the Brown Pond, Sanctuary Pond, and Ostracod Pond, exist although the wooded surround is becoming more dense and access to the last is very difficult because of brambles and nettles. The Brown Pond is the receiving end of ditches dug to drain fields on the London Clay. The ponds in copses have no visible waterweed so the ecosystem depends on detritus from dead leaves and microorganisms and again the water is brown with tannin, in this case from oak leaves. The Brown Pond was investigated with a Nonsuch Watch walk on 12 April 2014 and again on 31 May 2014. Like the Round Pond the waterlife was dominated by pink water fleas *Daphnia*, again with the contents of the gut black suggesting feeding on detritic material rather than unicellular green algae, and they were gravid with eggs in the brood pouch. Also in the water were some copepods *Cyclops* and some seed shrimps or ostracods *Cypris*. Insect life was represented by water beetles.

The south-west corner of Nonsuch Park is a natural drainage basin along the course of the former Earthbourne, now a dry valley and receiving surface runoff from the fields above on London Clay. It is the least acid of the Nonsuch Ponds with a pH of 6.5 measured by BDH indicator on 30 May 2005 and this would be due to the geology. It is the largest of the ponds, has aquatic vegetation and the richest general pond life. This is the 'Newly-dug Pond' of the 1994 Nonsuch paper. The London Road Plantation between this pond and the road is a damp area and was inundated this spring. From an open excavation into the clay in 1984 the habitat was well established with vegetation and open water by 1993 but started to silt up and vegetate with advancing growth of bulrush or reedmace *Typha latifolia* reducing the open water. Work parties from Sutton Conservation Volunteers started to clear *Typha* in 2003 but it soon comes back. By 2000 there was considerable development of two invasive aliens, parrot's-feather and New Zealand pigmy-weed, probably informally introduced from garden pond surplus. Another introduction, least duckweed, has also established.

Discussion

It has been useful to write this twenty-year update on Nonsuch reporting records that show continuation but also genuine new arrivals both natural and invasive introductions. In leading field meetings and courses at Nonsuch one is

impressed how much of interest there is to be seen and I rarely depart without seeing something new. The biodiversity adds to the amenity value of Nonsuch. Much targeted recording is still needed as well as volunteers to pull Canadian golden rod.

Since 1994 Nonsuch has been listed as an SNCI (Site of Nature Conservation Importance) that gives some protection in planning at county level. Local Nature Reserve Status also needs considering as this would help to promote the wildlife image to a wider audience and develop an understanding of the importance of natural history to the amenity and the need for knowledge of the wildlife to inform management, especially when decisions are made by those who are not naturalists. Continuing issues remain of the need for a balance between the human needs for the park and that for the wildlife that we enjoy and should look after for posterity. It is the quiet green environment of Nonsuch that is valued by visitors as a stress relief from modern society giving a real environmental service, but wild creatures need their refuges from us too, hence the value of scrub and areas where they seek relief from us. Whilst the boundaries of Nonsuch are mostly protected by woodland belts, issues arise from planning applications that involve tall lighting at night and this has adverse effects on many wild animals as well as its effect on dark skies. This topic was discussed by Alison Fure (2012), who undertook a recent bat survey for Nonsuch Watch. While the air is visually cleaner and mosses and lichens are returning to the London area there is an invisible enemy in nitrous oxides from motor vehicles that is polluting by eutrophication and encouraging rank vegetation. The pressure of cars around entrances harms trees where they park under the canopy damaging surface roots as around the Mansion House, so as the late Howard Davies would say, the 'polluting machines' should be left behind and encourage other modes of transport. Tree Protection Zones need to be brought into management plans. Standing dead wood is important and the risk can be managed by using prickly scrub to keep people away so that old hollow trunks can continue to be used as nesting sites for birds and insects.

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It is sad to note the loss of previous Nonsuch recorders in the last twenty years: Howard Davies, Peter Denny, Richard Fitter, Eric Groves, Peter Holland, Roy Hurr, Doris Hutchings, Ian Menzies, Frances Murphy, Bryan Radcliffe, John Sankey and Jean Wright. Obituaries of some of these are published in *The London Naturalist*, including the current issue.

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Additional species recorded in Nonsuch since 1993

TABLE 2. **Additional fungi and slime moulds.** Records are by the author unless otherwise acknowledged. Names according to the official fungus checklist (Legon et al. 2005), alternative names in brackets, most illustrated in Sterry and Hughes (2009).

Scientific name	English name	Notes
<i>Agaricus cf. silvicola</i>	Wood mushroom	Nonsuch Park, under mature oak by service wing of Mansion House, 4.xi.2001, Sparrow Farm Road gate, 22.xi.1999
<i>Ampulloclitocybe clavipes</i>	Club foot	Nonsuch Park, in clump below pines, 4.xi.2001
<i>Asteromella arbuticola</i>	Ascomycete	Nonsuch Park, front of Mansion House on <i>Arbutus unedo</i> as leaf spots, 21.iv.2013, B. M. Spooner. New to Great Britain , specimen at Kew
<i>Aulographum hederae</i>	Ascomycete	Nonsuch Park, on fallen ivy leaf, 21.iv.2013, B. M. Spooner. Specimen at Kew
<i>Boletus cisalpinus</i> (= <i>Xerocomus chrysenteron</i>)	Red-cracked bolete	Nonsuch Park, London Road Plantation, 29.viii.1999; below larches outside Mansion House gardens, 12.ix.2010
<i>Caducirostrum foliicola</i>	Ascomycete	Nonsuch Park, front of Mansion House on fallen leaves of <i>Viburnum tinus</i> , 21.iv.2013, B. M. Spooner
<i>Calocybe</i> (= <i>Tricholoma</i>) <i>gambosa</i>	St George's mushroom	Nonsuch Park, avenue behind Mansion House gardens, 26.iv.2008; Nursery site, 12.iv.2014, where it formed a ring
<i>Calvatia gigantea</i>	Giant puffball	Nonsuch Park, avenue by Ewell Gate, 18.viii.1996
<i>Chaetomium</i> sp.?	Ascomycete	Nonsuch Park, front of Mansion House on fallen branch of <i>Magnolia grandiflora</i> , 21.iv.2013, B. M. Spooner. New species? Specimen at Kew
<i>Clavulina coralloides</i>	Crested coral	Nonsuch Park, by Balancing Pond, by dead oak, 2008; Warren Farm, small patch on soil, northern path, 17.x.2013, J. Kaunang, G. A. Collins and D. Alder
<i>Clitocybe nebularis</i>	Cloud agaric	Nonsuch Park, arboretum at rear of Mansion House gardens and London Road Plantation, 21.ix.2013
<i>Collybia</i> (= <i>Rhodocollybia</i>) <i>butyracea</i>	Buttercap	Nonsuch Park, Mansion House gardens, 17.x.2013, J. Kaunang, G. A. Collins and D. Alder
<i>Collybia fusipes</i>	Spindleshank	Nonsuch Park, woodland strip by Cheam Gate, 4.xi.2001 and 26.x.2002
<i>Coprinus lagopus</i>	Hare's-foot inkcap	Nonsuch Park, copse by Sparrow Farm Road car park, 4.xi.2001
<i>Crepidotus mollis</i>	Peeling oysterling	Warren Farm, 17.x.2013, J. Kaunang, G. A. Collins and D. Alder
<i>Cryptostroma corticale</i>	Ascomycete – sooty bark disease of maple	Nonsuch Park, on sycamore post by Cheam Gate, 21.iv.2013, B. M. Spooner
<i>Diatrypella favacea</i>	Ascomycete	Nonsuch Park, on fallen birch branch, 21.iv.2013, B. M. Spooner
<i>Diatrypella</i> sp.	Ascomycete	Nonsuch Park, front of mansion House, on fallen branch of <i>Magnolia grandiflora</i> , 21.iv.2013, B. M. Spooner. Specimen at Kew
<i>Diplodia magnoliae</i>	Ascomycete	Nonsuch Park, in front of Mansion House, on fallen branch of <i>Magnolia grandiflora</i> , 21.iv.2013, B. M. Spooner. Specimen at Kew

<i>Entoloma lividoalbum</i>	Pinkgill	Warren Farm, by east fence, 17.x.2013, J. Kaunang, G. A. Collins and D. Alder
<i>Entyloma ficariae</i>	Celandine smut	Nonsuch Park, 21.iv.2013, B. M. Spooner
<i>Eutypa maura</i>	Ascomycete	Nonsuch Park, near cart sheds, on fallen branches of sycamore, with small mammal tooth marks, 21.iv.2013, B. M. Spooner
<i>Exosporium tiliae</i>	Ascomycete	Nonsuch Park, on fallen branch of hybrid lime, 21.iv.2013, B. M. Spooner
<i>Fistulina hepatica</i>	Beefsteak bracket	Nonsuch Park, on veteran oak on London Clay by Oak Plantation, 20.ix.2010 and 15.ix.2013
<i>Handkea (= Lycoperdon) exculpiformis</i>	Pestle puffball	Warren Farm, 30.vi.2010, J. Kaunang
<i>Hygrocybe psittacina</i>	Parrot waxcap	Warren Farm, 2 by east fence, 17.x.2013, J. Kaunang, G. A. Collins and D. Alder
<i>Hygrocybe virginea</i>	Snowy waxcap	Warren Farm, 2 in long grass, 17.x.2013, J. Kaunang, G. A. Collins and D. Alder
<i>Hygrophoropsis aurantiaca</i>	False chanterelle	Nonsuch Park, Mansion House gardens, 17.x.2013, J. Kaunang, G. A. Collins and D. Alder
<i>Inonotus dryadeus</i>	Oak bracket	Nonsuch Park, top of London Clay slope between The Wood and the drive, mature oak, 12.vii.2010, 12/20.ix.2010, 2 clumps lower on trunk, 17.iv.2013 and 15.ix.2013
<i>Kretzschmaria deusta</i>	Ascomycete	Nonsuch Park, on base of sycamore trunk, 21.iv.2013, B. M. Spooner
<i>Laccaria amethystina</i>	Amethyst deceiver	Warren Farm, group on ground by east fence, 17.x.2013, J. Kaunang, G. A. Collins and D. Alder
<i>Laccaria proxima</i>	Scurfy deceiver	Warren Farm, group in damp edge, 17.x.2013, J. Kaunang, G. A. Collins and D. Alder
<i>Lactarius deliciosus</i>	Saffron milkcap	Nonsuch Park, copse with pine by Sparrow Farm Road car park, 22.x.2005
<i>Lactarius pyrogalus</i>	Fiery milkcap	Warren Farm, under hazel by east fence, 17.x.2013, J. Kaunang, G. A. Collins and D. Alder
<i>Laetiporus sulphureus</i>	Chicken-of-the-woods	Nonsuch Park on veteran oak, 29.viii.1999 and by Sparrow Farm Road gate, 22.xi.1999
<i>Lycogala terrestre</i>	Slime mould	Nonsuch Park, plasmodium on dead wood, perimeter plantation by Cheam Park, c.2012.
<i>Lycoperdon perlatum</i>	Common puffball	Warren Farm, 9.vi.2004
<i>Marasmius alliaceus</i>	Garlic parachute	Nonsuch Park, 4.xi.2001
<i>Melanoleuca</i> sp.	Cavalier	Nonsuch Park, London Road Plantation, 29.viii.1999
<i>Mycena arcangeliana</i>	Angel's bonnet	Group on stick in wooded valley, Warren Farm, 17.x.2013, J. Kaunang, G. A. Collins and D. Alder
<i>Mycena galericulata</i>	Common bonnet	Nonsuch Park, 26.x.2002
<i>Mycena maculata</i>	Bonnet	Warren Farm, on wood, by east fence, 17.x.2013, J. Kaunang, G. A. Collins and D. Alder
<i>Mycena vitilis</i>	Snapping bonnet	Warren Farm, by east fence, 17.x.2013, J. Kaunang, G. A. Collins and D. Alder
<i>Otidea alutacea</i>	Tan ear	Warren Farm, small clump by east fence, 17.x.2013, J. Kaunang, G. A. Collins and D. Alder
<i>Paxillus involutus</i>	Brown rollrim	Nursery site by access path, 2.vii.2011

<i>Phanerochaete jose-ferreirae</i>	Basidiomycete	Nonsuch Park, on fallen branch of <i>Magnolia grandiflora</i> , 21.iv.2013, B. M. Spooner. New to England , specimen at Kew.
<i>Phellinus pomaceus</i>	Basidiomycete	Nonsuch Park, on cut log of <i>Prunus</i> sp., 21.iv.2013, B. M. Spooner
<i>Phragmidium violaceum</i>	Purple bramble rust	Warren Farm, on bramble leaves, 17.x.2013, J. Kaunang, G. A. Collins and D. Alder
<i>Pleurotus dryinus</i>	Veiled oyster	Warren Farm, on standing elm, valley wood, 17.x.2013, J. Kaunang, G. A. Collins and D. Alder
<i>Polyporus durus</i> (<i>badius</i>)	Bay polypore	Nonsuch Park, London Road Plantation, 29.viii.1999
<i>Puccinia liliacearum</i>	Rust	Nonsuch Park, front of Mansion House on leaves of <i>Ornithogalum</i> , 21.iv.2013, B. M. Spooner
<i>Rhodotus palmatus</i>	Wrinkled peach	Warren Farm, on dead elm, valley wood, 17.x.2013, J. Kaunang, G. A. Collins and D. Alder
<i>Septoria ornithogali</i>	Ascomycete	Nonsuch Park, in front of Mansion House on leaves of <i>Ornithogalum</i> , 21.iv.2013, B. M. Spooner. New to Great Britain , specimen at Kew
<i>Sirococcus</i> sp.	Ascomycete	Nonsuch Park, in front of Mansion House as leaf spot on <i>Arbutus unedo</i> , 21.iv.2013, B. M. Spooner. New species? Specimen at Kew
<i>Sphaceloma mattiroloanum</i>	Ascomycete	Nonsuch Park, in front of Mansion House on living leaves of <i>Arbutus unedo</i> , 21.iv.2013, B. M. Spooner
<i>Stereum gausapatum</i>	Bleeding oak crust	Nonsuch Park, by Balancing Pond, on oak wood, 2008; Warren Farm, dead oak branch by east fence, 17.x.2013, J. Kaunang, G. A. Collins and D. Alder
<i>Suillus grevillei</i>	Larch bolete	Nonsuch Park, larches behind Mansion House gardens, 12.ix.2010
<i>Tapirina pruni</i>	Pocket plum	Nonsuch Park, fruits of blackthorn (as gall), London Road Plantation, Sparrow Farm Road near gate, 2.vi.2014
<i>Trametes gibbosa</i>	Lumpy bracket	Nonsuch Park, on trunk base of horse-chestnut, 21.iv.2013, B. M. Spooner
<i>Tricholoma sculpturatum</i>	Yellow knight	Under oak on northern path, Warren Farm, 17.x.2013, J. Kaunang, G. A. Collins and D. Alder
<i>Tyromyces chionaeus</i>	White bracket	On log, valley wood, Warren Farm, 17.x.2013, J. Kaunang, G. A. Collins and D. Alder
<i>Uromyces ficariae</i>	Celandine rust	Nonsuch Park, 21.iv.2013, B. M. Spooner
<i>Ustilago avenae</i> ; see Spooner and Roberts (2005)	Loose smut	Nonsuch Park, meadows at foot of Oak Plantation and by grass path south of Mansion House on false oat grass <i>Arrhenatherum elatius</i> seedhead, 29.vi.2002
<i>Volvariella gloiocephala</i>	Stubble rosegill	Warren Farm, on debris of Canadian goldenrod, valley, 17.x.2013, J. Kaunang, G. A. Collins and D. Alder
<i>Xerula radicata</i>	Rooting shank	Warren Farm, 1 by east fence, 17.x.2013, J. Kaunang, G. A. Collins and D. Alder

TABLE 3. **Additional lichens**, mostly from Dobson (1995a, b).

<i>Agonimia tristicula</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Bacidia sabuletorum</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Caloplaca flavescens</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Caloplaca flavovirescens</i>	Nonsuch Park, Mansion House and garden, on stone, 8.i.1995, F. Dobson and British Lichen Society
<i>Caloplaca holocarpa</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Caloplaca teicholyta</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Candellariella aurella</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Candellariella medians</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Candellariella vitellina</i>	Nonsuch Park, Mansion House gardens, on iron trough, 8.i.1995, F. Dobson and British Lichen Society
<i>Catillaria chalybeia</i>	Nonsuch Park, Mansion House gardens, on iron trough, 8.i.1995, F. Dobson and British Lichen Society
<i>Cladonia pocillum</i>	Nonsuch Park, Mansion House gardens, wall of flint and chalk, 8.i.1995, F. Dobson and British Lichen Society
<i>Cliostomum griffithii</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Cyphelium notarisii</i>	Nonsuch Park, Mansion House gardens, on wooden seat, 13.iv.2003, F. Dobson
<i>Hypocenomyce scalaris</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Lecania erysibe</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Lecanora campestris</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Lecanora polytropa</i>	Nonsuch Park, Mansion House gardens, on iron trough, 8.i.1995, F. Dobson and British Lichen Society
<i>Lecanora saligna</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Lecanora symmicta</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Lecidella elaeochroma</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Lecidella scabra</i>	Nonsuch Park, Mansion House gardens, on iron trough, 8.i.1995, F. Dobson and British Lichen Society
<i>Lecidella stigmata</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Lepraria lesdainii</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Leptogium teretiusculum</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Micarea denigrata prasina</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society

<i>Mycoblastus sterilis</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Parmelia perlata</i>	Nonsuch Park, Round Pond, on willows, 8.i.1995, F. Dobson and British Lichen Society
<i>Parmelia subrudecta</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Parmeliopsis ambigua</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Phaeophyscia orbicularis</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Physcia aipolia</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Physcia caesia</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Physcia dubia</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Rinodina gennarii</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Sarcogyne regularis</i>	Nonsuch Park, Mansion House gardens, on stone, 8.i.1995, F. Dobson and British Lichen Society
<i>Scoliciosporum chlorococcum</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Scoliciosporum umbrinum</i>	Nonsuch Park, Mansion House gardens, on iron trough, 8.i.1995, F. Dobson and British Lichen Society
<i>Toninia aromatic</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Trapelia coarctata</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Trapelia involuta</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Trapeliopsis flexuosa</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Usnea subfloridana</i>	Nonsuch Park, Round Pond, on willows, 8.i.1995, F. Dobson and British Lichen Society
<i>Verrucaria glaucina</i>	Nonsuch Park, Mansion House gardens, on stone, 8.i.1995, F. Dobson and British Lichen Society
<i>Verrucaria hochstetteri</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Verrucaria macrostoma</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Verrucaria viridula</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society
<i>Xanthoria calcicola</i>	Nonsuch Park, 8.i.1995, F. Dobson and British Lichen Society

TABLE 4. **Additional species of bryophytes.** The names relate to the field guide by Atherton et al. (2010). Authorities are given in the checklist of Hill et al. (2008).

<i>Amblystegium serpens</i>	Creeping feather-moss	Nonsuch Park, The Wood, 31.xi.2013, J. Chatfield
<i>Colojeunea minutissima</i>	Minute pouncewort	Nonsuch Park, epiphyte on willow, Round Pond, 31.xi.2013, P. Howarth and J. Chatfield
<i>Cryphaea heteromalla</i>	Lateral cryphaea	Nonsuch Park, epiphyte on willow, Round Pond, 15.v.2013 and The Wood, 31.xi.2013, P. Howarth and J. Chatfield
<i>Didymodon nicholsonii</i>	Nicholson's beard-moss	Nonsuch Park, hard standing by cart sheds near Mansion House, 31.xi.2013, P. Howarth and J. Chatfield
<i>Frullania dilatata</i>	Dilated scalewort	Nonsuch Park, epiphyte on willow, Round Pond and The Wood, 31.xi.2013, P. Howarth and J. Chatfield
<i>Hypnum resupinatum</i>	Supine Plait-moss	Nonsuch Park, epiphyte on oak, The Wood and Round Pond Field, 31.xi.2013, P. Howarth and J. Chatfield
<i>Leptodictyium riparium</i>	Kneiff's feather-moss	Nonsuch Park, epiphyte low on willow, Round Pond, 31.xi.2013, P. Howarth
<i>Metzgeria furcata</i>	Forked veilwort	Nonsuch Park, epiphyte, Round Pond Field (ash) and The Wood (oak), 31.xi.2013, P. Howarth and J. Chatfield
<i>Rhychostegiella pumila</i>	Dwarf feather-moss	Nonsuch Park, 31.xi.2013, P. Howarth
<i>Rhynchostegiella tenella</i>	Tender feather-moss	Nonsuch Park, wall of banqueting house mound, 31.xi.2013, P. Howarth and J. Chatfield
<i>Riccia fluitans</i>	Floating crystalwort	Nonsuch Park, Balancing Pond, 21.iv.2013 and 31.v.2014
<i>Syntrichia latifolia</i>	Water screw-moss	Nonsuch Park, epiphyte in Mansion House garden, 31.xi.2013, P. Howarth
<i>Syntrichia papillosa</i>	Marble screw-moss	Nonsuch Park, epiphyte on ash, The Wood, 31.xi.2013, P. Howarth
<i>Thamnobryum alopecurum</i>	Foxtail feather-moss	Nonsuch Park, ground of coppice wood on track to Cheam Park, 31.xi.2013, J. Chatfield
<i>Tortula marginata</i>	Bordered screw-moss	Nonsuch Park, brick of barn, cart sheds by Mansion House, 31.ix.2013, P. Howarth
<i>Ulota bruchii</i>	Bruch's pincushion	Nonsuch Park, epiphyte on willow, Round Pond, 31.xi.2013, P. Howarth and J. Chatfield
<i>Zygodon viridissimus</i>	Green yoke-moss	Nonsuch Park, epiphyte on ash, The Wood, 31.xi.2013, P. Howarth

TABLE 5. **Additional vascular plants.** Names follow Stace (2010). Records are by the author unless otherwise acknowledged.

<i>Adoxa moschatellina</i>	Moschatel or townhall clock	Nonsuch Park, Mansion House gardens, E. Bennett, J. Kaunang and I. Kitching
<i>Alopecurus geniculatus</i>	Marsh foxtail	Nonsuch Park, Round Pond, 2005, I. Girvan; 9.vi.2007, J. Chatfield
<i>Anacamptis pyramidalis</i>	Pyramidal orchid	Warren Farm, single orchid in 1997, several thousands by 2012; a white one, 14.vii.2013
<i>Apium nodiflorum</i>	Fool's watercress	Nonsuch Park, Balancing Pond, 2005, I. Girvan
<i>Asparagus officinalis</i>	Asparagus	Warren Farm, Sleepy Field, 14.vii.2013, Nonsuch Watch
<i>Asplenium trichomanes</i>	Maidenhair spleenwort	Railway Bridge, Warren Farm, 10.vi.2012, J. Kaunang; 2014, J. Chatfield
<i>Atropa belladonna</i>	Deadly nightshade	Warren Farm, 2010, I. Girvan
<i>Azolla filiculoides</i>	Water fern	Nonsuch Park, Round Pond, 2007
<i>Berula erecta</i>	Water parsnip	Nonsuch Park, Balancing Pond, 25.vi.2011, R. Parker and G. Hounsome
<i>Bidens tripartita</i>	Trifid bur-marigold	Nonsuch Park, Round Pond, 2005, I. Girvan
<i>Caltha palustris</i>	Marsh marigold/kingcup	Nonsuch Park, Balancing Pond, 25.vi.2011, R. Parker and G. Hounsome; Nonsuch Park, Balancing Pond, 31.v.2014. .
<i>Campanula persicifolia</i>	Peach-leaved bellflower	Warren Farm, 25.vi.2011, R. Parker and G. Hounsome
<i>Carex divisa</i>	Grey sedge	Nonsuch Park, 2005, I. Girvan; Warren Farm, 2010, I. Girvan, 25.vi.2011, R. Parker and G. Hounsome
<i>Carex flacca</i>	Glaucous sedge	Nonsuch Park meadows, 15.v.2013
<i>Carex hirta</i>	Hairy sedge	Nonsuch Park, Balancing Pond, 2005, I. Girvan; Warren Farm, 2010, I. Girvan
<i>Carex muricata pairi</i> (= <i>lamprocarpa</i>)	Prickly sedge	Nonsuch Park, Great Meadow, 2005, I. Girvan; Warren Farm, 2010, I. Girvan
<i>Carex nigra</i>	Common sedge	Nonsuch Park, Snail Pond field, 2005, I. Girvan
<i>Carex otrubae</i>	False fox-sedge	Nonsuch Park, Balancing Pond, 2005, I. Girvan
<i>Carex paniculata</i>	Greater tussock sedge	Nonsuch Park, Pottery Wood, 2005, I. Girvan
<i>Carex pendula</i>	Pendulous sedge	Nonsuch Park, Pottery Wood, 2005, I. Girvan; Nursery site 19.vii.2000, 19.iv.2014, J. Chatfield
<i>Carex remota</i>	Remote sedge	Warren Farm, woodland path, 30.vii.1997, J. Byatt
<i>Carex sylvatica</i>	Wood sedge	Nonsuch Park, The Wood, 2005, I. Girvan; 12.iv.2014, J. Chatfield
<i>Carpinus betulus</i>	Hornbeam	Cherry Orchard Farm, Pottery Wood, 2005, I. Girvan; Surrey County Council strip, 2005, I. Girvan; near Banqueting House, 20.iv.2000; Nursery site 20.iv.2002, J. Chatfield

<i>Cerastium glomeratum</i>	Sticky mouse-ear	Nonsuch Park, 2005, I. Girvan
<i>Claytonia perfoliata</i>	Spring beauty	Nonsuch Park, Mansion House garden, on sandy soil
<i>Clematis vitalba</i>	Traveller's joy	Nursery, 17.vii.2000; Warren Farm, 2010, I. Girvan, Sleepy Field, 14.vii.2013
<i>Clinopodium vulgare</i>	Wild basil	Warren Farm, 1 plant, 30.vii.1997, J. Byatt, 2010, I. Girvan
<i>Cornus sanguinea</i>	Dogwood	Nonsuch Park, London Road Plantation edge 29.viii.1999, The Wood, 20.ix.2010
<i>Coronopus didymus</i>	Lesser swinecress	Nonsuch Park, Round Pond, 2005, I. Girvan
<i>Crassula helmsii</i>	Australian swamp stonecrop	Nonsuch Park, Balancing Pond, 4.x.2005, J. Kaunang.
<i>Crataegus laevigata</i>	Midland hawthorn	Nonsuch Park, Cheam Gate, 13.x.1996, The Wood
<i>Crepis biennis</i>	Rough hawkbit	Warren Farm, 25.vi.2011, R. Parker and G. Hounsome
<i>Crepis capillaris</i>	Smooth hawksbeard	Warren Farm, 8.vi.2001
<i>Cyperus longus</i>	Galingale	Nonsuch Park, Balancing Pond, 4.x.2005, 28.iv.2007 J. Kaunang and H. Davies
<i>Dactylorhiza fuchsii</i>	Common spotted orchid	Nonsuch Park, by Balancing Pond, 8.vi.2001 (5 plants), 9.vi.2007; Warren Farm, vi.2012
<i>Echinops bannaticus</i>	Blue globe-thistle (introduced)	Nursery site, 25.vi.2011 R. Parker and G. Hounsome
<i>Echinops sphaerocephalus</i>	Globe-thistle (introduced)	Nursery, 7.viii.2000, F. Wright
<i>Equisetum arvense</i>	Field horsetail	Nursery site, Ewell Gate, 19.vii.2000, 10.iv.2002 (cones)
<i>Erodium cicutarium</i>	Common stork's-bill	Nonsuch Park, 2005, I. Girvan
<i>Erophila verna</i>	Whitlow grass	Nursery site, on concrete, 19.iv.2014
<i>Euonymus europaeus</i>	Spindle	Warren Farm, 17.iv.2010, probably planted by Woodland Trust, 2010, I. Girvan
<i>Festuca arundinacea</i>	Tall fescue	Nonsuch Park, Snail Pond field, 2005, I. Girvan
<i>Filipendula vulgaris</i>	Dropwort	Warren Farm, 2010, I. Girvan
<i>Fraxinus angustifolia</i>	Narrow-leaved ash (planted)	Nursery site, 25.vi.2011, R. Parker and G. Hounsome
<i>Galega officinalis</i>	Goat's rue	Nursery, 19.vii.2000; Nonsuch Park, 2005, I. Girvan; Warren Farm, 2010, I. Girvan
<i>Geranium lucidum</i>	Shining crane's-bill	Nursery site, Ewell Gate, 25.iv.2009, 31.v.2014
<i>Geranium pusillum</i>	Small-flowered crane's-bill	Warren Farm, 2010, I. Girvan
<i>Ginkgo biloba</i>	Maidenhair tree	Mansion House garden, 19.xi.2009

<i>Glyceria</i> sp.	Sweet-grass	Nonsuch Park, Balancing Pond, 31.v.2014
<i>Glyceria fluitans</i>	Floating sweet-grass	Nonsuch Park, Balancing Pond, 2005, I. Girvan
<i>Glyceria maxima</i>	Reed sweet-grass	Nonsuch Park, Balancing Pond, 2005, I. Girvan
<i>Gnaphalium uliginosum</i>	Marsh cudweed	Nonsuch Park, Round Pond, 2005, I. Girvan
<i>Herniaria glabra</i>	Smooth rupturewort	First found by J. Kaunang on Nursery site hard surface, photographed 25.iv.2009, still there on bare ground, 25.vi.2011, R. Parker and G. Hounsome
<i>Hordeum secalinum</i>	Meadow barley-grass	Nonsuch Park, valley fields, 9.vi.2000, Russett Field, 20.vii.2000
<i>Hyacinthoides</i> spp.	Garden/Spanish bluebell and hybrids	Nonsuch Park and Nursery site, 2014, now widespread and abundant in perimeter woodland plantations; Warren Farm, 2010, I. Girvan. Not recorded as this before
<i>Hypericum androsaemum</i>	Tutsan	Nursery site, 19.vii.2000
<i>Hypericum maculatum</i>	Imperforate St John's-wort	Nonsuch Park, 2005, I. Girvan
<i>Impatiens glandulifera</i>	Himalayan balsam	Cheam Park, pond near Cheam gate, 2005, I. Girvan
<i>Iris foetidissima</i>	Stinking iris	Surrey County Council strip behind Mansion House garden, secondary woodland, 2.vi.2001
<i>Lactuca virosa</i>	Great lettuce	Warren Farm, 25.vi.2011, R. Parker and G. Hounsome
<i>Larix decidua</i>	European larch	Nonsuch Park, 2005, I. Girvan
<i>Larix japonica</i>	Japanese larch	Nonsuch Park, outside Mansion House garden, 19.xi.2009
<i>Lathyrus latifolius</i>	Broad-leaved everlasting-pea	Warren Farm, 2010, I. Girvan
<i>Lemna minuta</i>	Least duckweed	Nonsuch Park, Balancing Pond, 2005, I. Girvan, 31.v.2014
<i>Lemna trisulca</i>	Ivy-leaved duckweed	Nonsuch Park, Balancing Pond, 31.v.2014
<i>Lycopus europaeus</i>	Gypsywort	Nonsuch Park, Round Pond, 2005, I. Girvan
<i>Lysimachia nummularia</i>	Creeping Jenny	Nonsuch Park, Balancing Pond, 2005, I. Girvan; 28.iv.2007 J. Kaunang
<i>Lysimachia vulgaris</i>	Yellow loosestrife	Nonsuch Park, Balancing Pond, 2005, I. Girvan
<i>Medicago sativa sativa</i>	Lucerne	Nonsuch Park, 2005, I. Girvan
<i>Menyanthes trifoliata</i>	Bogbean	Nonsuch Park, Balancing Pond 6.vi.2001; 28.iv.2007, J. Kaunang
<i>Mycelis muralis</i>	Wall lettuce	Warren Farm, 2010, I. Girvan
<i>Myriophyllum aquaticum</i>	Parrot's-feather	Nonsuch Park, Balancing Pond, 2005, I. Girvan; 4.x.2005; 28.iv.2007, J. Kaunang; 25.vi.2011, R. Parker and G. Hounsome. Erroneously recorded before as <i>Hippurus vulgaris</i>

<i>Ophrys apifera</i>	Bee orchid	Warren Farm, vi.2010, J. Kaunang
<i>Origanum vulgare</i>	Marjoram	Warren Farm, 2010, I. Girvan, Sleepy Field, 14.vii.2013
<i>Ornithogalum umbellatum</i>	Star-of-Bethlehem	Great Mead, Nonsuch Park, 2006, J. Chatfield and J. Kaunang.
<i>Ornithogalum nutans</i>	Drooping Star-of-Bethlehem	Nonsuch Park, Mansion House, 7.iv.2007, J. Kaunang, 17.iv.2010.
<i>Papaver hybridum</i>	Rough poppy	Warren Farm, 2010, I. Girvan
<i>Phragmites australis</i>	Common reed	Nonsuch Park, Balancing Pond, 2005, I. Girvan
<i>Plantago media</i>	Hoary plantain	Warren Farm, 2010, I. Girvan
<i>Polypogon viridis</i>	Water bent (introduced)	Nursery site, 25.vi.2011, R. Parker and G. Hounsome
<i>Populus canadensis</i>	Hybrid black poplar	Nonsuch Park, Portway, 2005, I. Girvan
<i>Populus nigra italica</i>	Lombardy poplar	Nonsuch Park, outside London Road Plantation, 29.viii.1999
<i>Populus tremula</i>	Aspen	Warren Farm, 2010, I. Girvan
<i>Prunus cerasifera</i>	Cherry plum	Nonsuch Park, Portway, 2005, I. Girvan; Warren Farm, 2010, I. Girvan
<i>Prunus serotina</i>	Rum cherry	Warren Farm, 2010, I. Girvan
<i>Pulicaria dysenterica</i>	Common fleabane	Nonsuch Park, 2005, I. Girvan; Warren Farm, Sleepy Field 14.vii.2013
<i>Ranunculus peltatus</i>	Round-leaved water crow-foot	Nonsuch Park, Round Pond, 9.vi.2007
<i>Rhinanthus angustifolius</i>	Greater yellow-rattle	Warren Farm, 2014, J. Kaunang and G. A. Collins
<i>Rhinanthus minor</i>	Yellow rattle	Warren Farm, 14.vii.2013
<i>Ribes sanguineum</i>	Flowering currant	Nursery site, 19.iv.2014
<i>Ribes uva-crispa</i>	Gooseberry	Nonsuch Park, North Plantation, 20.iv.2000, 14.vii.2013
<i>Rubus caesius</i>	Dewberry	Warren Farm, 9.vi.2007
<i>Rubus cockburnianus</i>	White-stemmed bramble (planted)	Nursery site, 25.vi.2011, R. Parker and G. Hounsome
<i>Rubus idaeus</i>	Raspberry	Cherry Orchard Farm, 2005, I. Girvan
<i>Rumex pulcher</i>	Fiddle dock	Nonsuch Park, Balancing Pond, 2005, I. Girvan
<i>Sagittaria latifolia</i>	Duck-potato	Nonsuch Park, Balancing Pond 25.vi.2011, R. Parker and G. Hounsome
<i>Salix fragilis</i>	Crack willow	Nonsuch Park, Round Pond, 2005, I. Girvan
<i>Scirpus sylvaticus</i>	Wood club-rush	Nonsuch Park, Balancing Pond, 2005, I. Girvan

<i>Sedum rupestre</i>	Reflexed stonecrop (introduced)	Warren Farm, 25.vi.2011, R. Parker and G. Hounsome
<i>Solidago gigantea</i>	Early goldenrod (introduced)	Warren Farm, 2010, I. Girvan, 25.vi.2011, R. Parker and G. Hounsome
<i>Sorbus aucuparia</i>	Rowan	Warren Farm, 2010, I. Girvan
<i>Sparganium erectum</i>	Branched bur-reed	Nonsuch Park, Balancing Pond, 2005, I. Girvan
<i>Spergula arvensis</i>	Corn spurrey	Warren Farm, towards new houses, East Ewell, R. D. Hawkins, 2010, I. Girvan
<i>Spergularia rubra</i>	Sand spurrey	Nursery site, 25.vi.2011, R. Parker and G. Hounsome
<i>Stellaria pallida</i>	Lesser chickweed	Nonsuch Park, Mansion House gardens, H. Davies
<i>Symporicarpos albus</i>	Snowberry	Warren Farm, 2010, I. Girvan
<i>Tragopogon pratensis minor</i>	Goat's-beard (native)	Nursery site, 25.vi.2011, R. Parker and G. Hounsome
<i>Tragopogon pratensis pratensis</i>	Goat's-beard (introduced)	Nursery site, 25.vi.2011, R. Parker and G. Hounsome
<i>Trifolium arvense</i>	Haresfoot clover	Warren Farm, towards new houses, East Ewell, R. D. Hawkins
<i>Typha angustifolia</i>	Lesser bulrush	Balancing Pond, Nonsuch Park, 2005, I. Girvan; 4.x.2005, 28.iv.2007, J. Kaunang
<i>Typha latifolia</i>	Bulrush	Nonsuch Park Balancing Pond, 2005, I. Girvan; 4.x.2005, 28.iv.2007, J. Kaunang; 25.vi.2011, R. Parker and G. Hounsome
<i>Veronica beccabunga</i>	Brooklime	Balancing Pond, Nonsuch Park, 4.x.2005, J. Kaunang; 31.v.2014
<i>Veronica montana</i>	Wood speedwell	Surrey County Council strip, secondary woodland, 6.vi.2001
<i>Viburnum lantana</i>	Wayfaring-tree	Warren Farm, 2010, I. Girvan
<i>Viburnum opulus</i>	Guelder-rose	Warren Farm, 2010, I. Girvan
<i>Vicia tetrasperma</i>	Smooth tare	Warren Farm, 2010, I. Girvan
<i>Viola reichenbachiana</i>	Early wood violet	North Plantation, Nonsuch Park, 20.iv.2000
<i>Viscum album</i>	Mistletoe	Nonsuch Park, poplars near Sparrow Farm Road gate, 2005, I. Girvan; 17.iv.2010, 17.iv.2013, and Brown Pond, 12.iv.2014, copse between Round Pond and Balancing Pond, 21.xi.2013. Spreading

TABLE 6. Spiders additional to the list of 1993.

Scientific name	English name	Family	Records
<i>Anelosimus</i> sp., juvenile A	Comb-footed spiders	Theridiidae	Nonsuch Park, on oak, 16.viii.2014, T. Thomas
<i>Anelosimus vittatus</i>	Comb-footed spiders	Theridiidae	Coppiced sycamore wood, and The Wood, Nonsuch Park, 15.v.2013, T. Thomas
<i>Araniella</i> sp., juvenile B	Cucumber spider	Araneidae	Coppiced sycamore wood, and The Wood beaten from sycamore, Nonsuch Park, 15.v.2013, T. Thomas
<i>Clubiona comta</i>	Foliage spiders	Clubionidae	Coppiced sycamore wood, and The Wood, Nonsuch Park, 15.v.2013, T. Thomas
<i>Cyclosa conica</i>	Orb-web spiders	Araneidae	Coppiced sycamore wood and beaten from sycamore, Nonsuch Park, 15.v.2013, T. Thomas
<i>Diae a dorsata</i>	Crab spiders	Thomisidae	Coppiced sycamore wood, and The Wood, Nonsuch Park, 15.v.2013, T. Thomas
<i>Entelacara acuminata</i>	Money spiders	Linyphiidae	The Wood, Nonsuch Park, 15.v.2013, T. Thomas
<i>Leptophantes</i> sp., juvenile C	Money spiders	Linyphiidae	16.viii.2014, T. Thomas
<i>Neriene peltata</i>	Money spiders	Linyphiidae	Coppiced sycamore wood, and The Wood, Nonsuch Park, 15.v.2013, T. Thomas
<i>Paidiscura pallens</i>	Comb-footed spiders	Theridiidae	Coppiced sycamore wood, Nonsuch Park, 15.v.2013, T. Thomas
<i>Philodromus albidus</i>	Running crab spiders	Philodromidae	Grassland free of goldenrod, Warren Farm, 16.viii.2014, T. Thomas
<i>Pholcus phalangioides</i>	Daddy-long-legs spider	Pholcidae	Toilets at Mansion House, Nonsuch Park, 16.viii.2014, T. Thomas
<i>Theridion mystaceum</i>	Comb-footed spiders	Theridiidae	Coppiced sycamore wood, Nonsuch Park, 15.v.2013, T. Thomas
<i>Trochosa terricola</i>	Wolf spiders	Lycosidae	Under log by Cheam Gate, Nonsuch Park, 15.v.2013, J. Chatfield, det. T. Thomas

Notes on spiders: A – *Anelosimus* sp. is likely to be *A. vittatus* as this is the commonest of the genus but adults are needed for positive identification. B – *Araniella* sp. is one of five species of trees and lower shrubs but adults are needed for positive identification. C – *Leptophantes* sp. is one of 21 species in the genus, two of which are common, but adults are needed for positive identification.

TABLE 7. Additional records of butterflies and moths.

Scientific name	English name	Records
<i>Abrostola tripartita</i> (= <i>triplasia</i>)	Spectacle	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Acentria ephemerella</i>	Water veneer	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Acleris forsskaleana</i>	Micromoth	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Acronicta psi</i>	Grey dagger	Nonsuch Park, 12.vii.2006, larva, P. R. Wheeler
<i>Adela fibulella</i>	Little longhorn	16.v.1998, BENHS field meeting
<i>Agapeta hamana</i>	Micromoth	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Agapeta zoegana</i>	Micromoth	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Agriophila straminella</i>	Micromoth	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Agriphila geniculea</i>	Micromoth	Nonsuch Park, 25.viii.2006, P. R. Wheeler; Warren Farm, 25.viii.2006, P. R. Wheeler
<i>Agriphila tristella</i>	Micromoth	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Agrochola circellaris</i>	Brick	Nonsuch Park, 27.ix.2006, P. R. Wheeler
<i>Agrotis clavis</i>	Heart and club	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Agrotis exclamationis</i>	Heart and dart	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Agrotis puta</i>	Shuttle-shaped dart	Nonsuch Park, 25.viii.2006, P. R. Wheeler
<i>Alcis repandata</i>	Mottled beauty	Nonsuch Park, 25.viii.2006, P. R. Wheeler
<i>Amphipyra berbera</i> <i>svenssoni</i>	Svensson's copper underwing	Nonsuch Park, 25.viii.2006, P. R. Wheeler; Warren Farm, 25.viii.2006, P. R. Wheeler
<i>Apemea crenata</i>	Cloud-bordered brindle	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Archips</i> (= <i>Acleris</i>) <i>xylosteana</i>	Variegated fruit-tree tortrix	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Argyresthia albistria</i>	Micromoth	Warren Farm, 27.ix.2006, P. R. Wheeler
<i>Aricia agrestis</i>	Brown argus	Warren Farm, 14.v.1995, Butterfly Conservation
<i>Batia lunaris</i>	Micromoth	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Batia unitella</i>	Micromoth	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Blastobasis adustella</i> (= <i>ligneata</i>)	Micromoth	Nonsuch Park, 12.vii.2006, P. R. Wheeler; Warren Farm, 27.ix.2006, P. R. Wheeler
<i>Blastobasis lacticolella</i> (= <i>decolorella</i>)	Micromoth	Nonsuch Park, 25.viii.2006 and 27.ix.2006, P. R. Wheeler
<i>Bryotropha terrella</i>	Micromoth	Warren Farm, 27.ix.2006, P. R. Wheeler
<i>Bucculatrix ulmella</i>	Micromoth	Nonsuch Park, 27.ix.2006, P. R. Wheeler
<i>Caloptilia robustella</i>	Micromoth	Warren Farm, 27.ix.2006, P. R. Wheeler
<i>Caloptilia semifascia</i>	Micromoth	Warren Farm, 27.ix.2006, P. R. Wheeler
<i>Cameraria ohridella</i>	Horse-chestnut leaf miner	Nonsuch Park, by Cheam Gate, leaf mines and adults, horse-chestnut tree, vii.2005, R. D. Hawkins; on all horse-chestnuts, 28.xi.2005–30.ix.2006, P. R. Wheeler. Still widespread in Nonsuch
<i>Campaea margaritata</i>	Light emerald	Nonsuch Park, 25.viii.2006, P. R. Wheeler
<i>Camptogramma bilineata</i>	Yellow shell	Nonsuch Park, 12.vii.2006 and 25.viii.2006, P. R. Wheeler; Warren Farm, 10.vi.2012, G. A. Collins

<i>Carcina quercana</i>	Micromoth	Warren Farm, 27.ix.2006, P. R. Wheeler
<i>Carpatolechia fugitivella</i>	Micromoth	Nonsuch Park, 12.vii.2006, P. R. Wheeler, Surrey Notable
<i>Celypha lacunana</i>	Micromoth	Nonsuch Park, 25.viii.2006, P. R. Wheeler; Warren Farm, 25.viii.2006, P. R. Wheeler
<i>Chrysoteuchia culmella</i>	Micromoth	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Clavigesta purdeyi</i>	Pine leaf-mining moth	Nonsuch Park, 12.vii.2006, P. R. Wheeler, Surrey Notable
<i>Clepsis consimilana</i>	Micromoth	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Cnephasia incertana</i>	Light grey tortrix	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Cochylimorpha straminea</i>	Micromoth	Nonsuch Park, 25.viii.2006, P. R. Wheeler
<i>Cochylis hybridella</i>	Micromoth	Nonsuch Park, 25.viii.2006, P. R. Wheeler; Warren Farm, 27.ix.2006, P. R. Wheeler
<i>Colostygeia pectinataria</i>	Green carpet	Nonsuch Park, 25.viii.2006, P. R. Wheeler
<i>Conistra vaccinii</i>	Chestnut	Nonsuch Park, 27.ix.2006, P. R. Wheeler
<i>Cosmia affinis</i>	Lesser-spotted pinion	Nonsuch Park, 25.viii.2006, P. R. Wheeler. Local, scarce
<i>Cosmia trapezina</i>	Dun-bar	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Crambus lathoniellus</i>	Grass-veneer	Warren Farm, 10.vi.2012, G. A. Collins
<i>Crambus pascuella</i>	Micromoth	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Craniophora ligustri</i>	Coronet	Nonsuch Park, 12.vii.2006, P. R. Wheeler. Local
<i>Cupido minimus</i>	Small blue	Warren Farm, 9.iv.2011, in cop., J. Kaunang
<i>Cyclophora punctaria</i>	Maiden's blush	Nonsuch Park, 25.viii.2006, P. R. Wheeler
<i>Cydia fagiglandana</i>	Micromoth	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Diachrysia chrysitis</i>	Burnished brass	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Diarsia rubi</i>	Small square-spot	Nonsuch Park, 25.viii.2006, P. R. Wheeler
<i>Ditula angustiorana</i>	Red barred tortrix	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Drepana binaria</i>	Oak hook-tip	Nonsuch Park, meadow SE of Mansion House gardens, P. R. Wheeler, 25.viii.2006
<i>Ectoedemia subbimaculella</i>	Micromoth	Leaf mine; Nonsuch Park, avenue by Mansion House, on oak, P. R. Wheeler, 28.xi.2005
<i>Eilema complana</i>	Scarce footman	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Eilema lurideola</i>	Common footman	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Elophila nymphaea</i>	Brown china-mark	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Emmelina monodactyla</i>	Plume moth	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Emmetia marginea</i>	Micromoth	Leaf mine, Nonsuch Park, avenue by Mansion House, on bramble, P. R. Wheeler, 28.xi.2005
<i>Endotricha flammealis</i>	Micromoth	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Epinotia nisella</i>	Micromoth	Nonsuch Park, 25.viii.2006, P. R. Wheeler
<i>Epinotia ramella</i>	Micromoth	Nonsuch Park, 25.viii.2006, P. R. Wheeler
<i>Epiphyas postvittana</i>	Light brown apple moth	Nonsuch Park, 2.ix.2006, P. R. Wheeler

<i>Epirrhoa alternata</i>	Common carpet	Nonsuch Park, 12.vii.2006, 25.viii.2006, P. R. Wheeler
<i>Eucosma cana</i>	Micromoth	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Eudonia (=Dipleurina) lacustrata</i>	Micromoth	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Euphyia umangulata</i>	Sharp-angled carpet	Nonsuch Park, 25.viii.2006, P. R. Wheeler. Restricted, increasing
<i>Eupithecia absinthiata</i>	Wormwood pug	Warren Farm, 25.viii.2006, P. R. Wheeler
<i>Eupithecia icterata</i>	Tawny-speckled pug	Nonsuch Park, 25.viii.2006, P. R. Wheeler
<i>Eurrhypara hortulata</i>	Small magpie	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Gymnoscelis rufifasciata</i>	Double-striped pug	Nonsuch Park, 12.vii.2006, 25.viii.2006, P. R. Wheeler
<i>Gypsonoma dealbana</i>	Micromoth	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Habrosyne pyritoides</i>	Buff arches	Nonsuch Park, avenue at back of Mansion House gardens, P. R. Wheeler, 12.vii.2006
<i>Hellinsia (=Leioptilis) carphodactyla</i>	Plume moth	Warren Farm, 25.viii.2006, P. R. Wheeler. Notable NB
<i>Hoffmannophila pseudospretella</i>	Brown house moth	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Hoplodrina ambigua</i>	Vine's rustic	Nonsuch Park, 25.viii.2006, P. R. Wheeler; Warren Farm, 25.viii.2006, P. R. Wheeler
<i>Hydrelia flammeolaria</i>	Small yellow wave	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Hyloicus pinastri</i>	Pine hawk-moth	Nonsuch Park, 25.viii.2006, P. R. Wheeler
<i>Hypena proboscidalis</i>	Snout	Nonsuch Park, 12.vii.2006, 27.ix.2006, P. R. Wheeler
<i>Hypsopygia costalis</i>	Gold triangle	Nonsuch Park, 12.vii.2006 and 27.ix.2006, P. R. Wheeler
<i>Idaea aversata</i>	Riband wave	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Idaea biselata</i>	Small fan-footed wave	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Idaea dimidiata</i>	Single-dotted wave	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Idaea vulpinaria</i>	Least carpet	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Lymantria monacha</i>	Black arches	Nonsuch Park, 12.vii.2006, 25.viii.2006, P. R. Wheeler. Restricted, increasing
<i>Lyonetia clerkella</i>	Micromoth	Leaf mine; Nonsuch Park, avenue by Mansion House, on hawthorn and apple, 30.ix.2006, P. R. Wheeler
<i>Melanargia galathea</i>	Marbled white	Warren Farm, 12.vii.2010, J. Chatfield; 25.vi.2011, R. Parker and G. Hounsome
<i>Melanchra persicariae</i>	Dot moth	Warren Farm, 27.ix.2006, P. R. Wheeler
<i>Mesapamea didyma</i>	Lesser common rustic	Nonsuch Park, 25.viii.2006, P. R. Wheeler
<i>Mesapamea secalis</i>	Common rustic	Nonsuch Park, 25.viii.2006, P. R. Wheeler
<i>Miltochrista miniata</i>	Rosy footman	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Mormo maura</i>	Old lady	Nonsuch Park, 25.viii.2006, P. R. Wheeler
<i>Mythimna conigera</i>	Brown-line bright-eye	Nonsuch Park, 12.vii.2006, P. R. Wheeler. Restricted
<i>Mythimna impura</i>	Smoky wainscot	Nonsuch Park, 12.vii.2006, P. R. Wheeler; Warren Farm, 25.viii.2006, P. R. Wheeler
<i>Mythimna pallens</i>	Common wainscot	Nonsuch Park, 12.vii.2006, P. R. Wheeler; Warren Farm, 25.viii.2006, P. R. Wheeler

<i>Noctua comes</i>	Lesser yellow underwing	Warren Farm, 27.ix.2006, P. R. Wheeler
<i>Noctua janthe</i>	Lesser broad-bordered yellow underwing	Nonsuch Park, 25.viii.2006, 27.ix.2006, P. R. Wheeler
<i>Noctua pronuba</i>	Large yellow underwing	Nonsuch Park, 25.viii.2006, 27.ix.2006, P. R. Wheeler; Warren Farm, 25.viii.2006, P. R. Wheeler
<i>Nomophila noctuella</i>	Rush veneer	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Notodonta dromedarius</i>	Iron prominent	Warren Farm, 25.viii.2006, P. R. Wheeler
<i>Ochropleura plecta</i>	Flame shoulder	Nonsuch Park, 25.viii.2006, P. R. Wheeler
<i>Ocnerostoma friesei</i>	Micromoth	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Opisthograptis luteolata</i>	Brimstone moth	Nonsuch Park, 12.vii.2006, 25.viii.2006, P. R. Wheeler; Warren Farm, 25.viii.2006, P. R. Wheeler
<i>Ourapteryx sambucaria</i>	Swallow-tailed moth	Nonsuch Park, 25.viii.2006, P. R. Wheeler
<i>Pammene fasciana</i>	Micromoth	Nonsuch Park, 12.vii.2006, P. R. Wheeler. Notable NB. Now fairly common
<i>Pandemis cerasana</i>	Barred fruit-tree tortrix	Nonsuch Park, 25.viii.2006, P. R. Wheeler; Warren Farm, 25.viii.2006, P. R. Wheeler
<i>Pandemis heparana</i>	Dark fruit-tree tortrix	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Paraswanammerdamia albicapitella</i>	Micromoth	Warren Farm, 27.ix.2006, P. R. Wheeler
<i>Parornix anglicella</i>	Micromoth	Leaf mine; Nonsuch Park, avenue by Mansion House, on hawthorn, P. R. Wheeler, 28.xi.2005
<i>Pediasia contaminella</i>	Micromoth	Nonsuch Park, 12.vii.2006, P. R. Wheeler, Notable NB
<i>Pelurga comitata</i>	Dark spinach	Nonsuch Park, 12.vii.2006, P. R. Wheeler. Local, declining
<i>Peribatodes rhomboidaria</i>	Willow beauty	Nonsuch Park, 25.viii.2006, P. R. Wheeler; Warren Farm, 25.viii.2006, P. R. Wheeler
<i>Phalera bucephala</i>	Buff-tip	Caterpillars on oak at edge of North Plantation, Nonsuch Park, c.2005, J. Chatfield
<i>Phtheochroa inopiana</i>	Micromoth	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Phyllonorycter acerifoliella</i>	Micromoth	Leaf mine; Nonsuch Park, on field maple, P. R. Wheeler, 28.xi.2005
<i>Phyllonorycter corylifoliella</i>	Micromoth	Leaf mine; Nonsuch Park, avenue by Mansion House, on hawthorn, P. R. Wheeler, 28.xi.2005, 30.ix.2006
<i>Phyllonorycter harrisella</i>	Micromoth	Leaf mine; Nonsuch Park, avenue by Mansion House, on oak, P. R. Wheeler, 28.xi.2005
<i>Phyllonorycter kleemannella</i>	Micromoth	Leaf mine; Nonsuch Park, on alder, P. R. Wheeler, 28.xi.2005
<i>Phyllonorycter lautella</i>	Micromoth	Leaf mine; Nonsuch Park, on oak, P. R. Wheeler, 28.xi.2005
<i>Phyllonorycter maestingella</i>	Micromoth	Leaf mine; Nonsuch Park, avenue by Mansion House, on beech, P. R. Wheeler, 28.xi.2005
<i>Phyllonorycter oxycanthae</i>	Micromoth	Leaf mine; Nonsuch Park, avenue by Mansion House, on hawthorn, P. R. Wheeler, 28.xi.2005, 30.ix.2006
<i>Phyllonorycter quercifoliella</i>	Micromoth	Leaf mine; Nonsuch Park, on oak, 12.vi.2006, P. R. Wheeler
<i>Phyllonorycter rajella</i>	Micromoth	Leaf mine; Nonsuch Park, on alder, P. R. Wheeler, 28.xi.2005
<i>Phyllonorycter salicicolella</i>	Micromoth	Leaf mine; Nonsuch Park, on goat willow, 25.viii.2006, P. R. Wheeler. Surrey Notable
<i>Phyllonorycter schreberella</i>	Micromoth	Leaf mine; Nonsuch Park, on elm, 28.xi.2005, P. R. Wheeler

<i>Phyllonorycter tristrigella</i>	Micromoth	Leaf mine; Nonsuch Park, on alder, 28.xi.2005, P. R. Wheeler
<i>Piniphila bifasciana</i>	Micromoth	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Pleuroptya ruralis</i>	Mother-of-pearl	Nonsuch Park, 12.vii.2006, P. R. Wheeler; Warren Farm, 25.viii.2006, P. R. Wheeler
<i>Plutella xylostella</i>	Micromoth	Warren Farm, 27.ix.2006, P. R. Wheeler
<i>Prays fraxinella</i>	Ash bud moth	Nonsuch Park, 25.viii.2006, P. R. Wheeler
<i>Pseudaips prasinana</i>	Green silver-lines	Round Pond, Nonsuch Park, 9.vi.2007, J. Chatfield
<i>Pterophorus pentadactylus</i>	White plume moth	Nonsuch Park, 12.vii.2006, P. R. Wheeler; Warren Farm, in long grass, 14.vii.2013, J. D. Glasgow
<i>Rhyacionia pinicolana</i>	Micromoth	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Rivula sericealis</i>	Straw dot	Nonsuch Park, 25.viii.2006, P. R. Wheeler; Warren Farm, 25.viii.2006, P. R. Wheeler
<i>Scoparia ambigualis</i>	Micromoth	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Scoparia pyralella</i>		Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Semiothisa liturata</i>	Tawny-barred angle	Nonsuch Park, 25.viii.2006, P. R. Wheeler
<i>Spilonota ocellana</i>	Bud moth	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Stigmella aurella</i>	Bramble leaf miner	Leaf mine, Nonsuch Park, avenue by Mansion House, on bramble, P. R. Wheeler, 28.xi.2005; The Wood, 12.iv.2014; Coppiced perimeter wood, Nonsuch Park and Nursery site, 19.iv.2014, J. Chatfield
<i>Stigmella basiguttella</i>	Micromoth	Leaf mine; Nonsuch Park, avenue by Mansion House, on oak, 28.xi.2005, P. R. Wheeler
<i>Stigmella hemargyrella</i>	Micromoth	Leaf mine, Nonsuch Park, avenue by Mansion House, on beech, 28.xi.2005, P. R. Wheeler
<i>Stigmella lemniscella</i>	Micromoth	Leaf mine, Nonsuch Park, by Cheam Gate car park and avenue by Mansion House, on common elm and wych elm, 28.xi.2005, P. R. Wheeler
<i>Stigmella tityrella</i>	Micromoth	Leaf mine, Nonsuch Park, avenue by Mansion House, on beech, 28.xi.2005, P. R. Wheeler
<i>Stigmella ulmivora</i>	Micromoth	Leaf mine, Nonsuch Park, by Cheam Gate car park, on common elm and wych elm, P. R. Wheeler, 28.xi.2005
<i>Strophedra nitidana</i>	Micromoth	Nonsuch Park, 12.vii.2006, P. R. Wheeler. Notable NB and Surrey Notable
<i>Swammerdamia pyrella</i>	Micromoth	Warren Farm, 27.ix.2006, P. R. Wheeler
<i>Thalpophila matura</i>	Straw underwing	Nonsuch Park, 25.viii.2006, P. R. Wheeler; Warren Farm, 25.viii.2006, P. R. Wheeler
<i>Thera obeliscata</i>	Grey pine carpet	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Xanthia aurago</i>	Barred sallow	Nonsuch Park, 27.ix.2006, P. R. Wheeler
<i>Xestia sexstrigata</i>	Six-striped rustic	Nonsuch Park, 25.viii.2006, P. R. Wheeler; Warren Farm, 25.viii.2006, P. R. Wheeler
<i>Xestia triangulum</i>	Double square spot	Nonsuch Park, 12.vii.2006, P. R. Wheeler
<i>Xestia xanthographa</i>	Square-spot rustic	Nonsuch Park, 25.viii.2006, P. R. Wheeler. Warren Farm, 25.viii.2006, P. R. Wheeler
<i>Ypsolopha vittella</i>	Micromoth	Warren Farm, 27.ix.2006, P. R. Wheeler. Very local in Surrey

TABLE 8. Additional insect records.

Scientific name	Group	English name	Notes
<i>Adalia bipunctata</i>	Coleoptera	2-spot ladybird	Nonsuch Park, by Round Pond, 28.iv.2007
<i>Aelia acuminata</i>	Hemiptera	Bishops mitre	Cherry Orchard Farm, in cock's-foot grass, 16.v.2004, J. Kaunang and R. D. Hawkins
<i>Agapanthia villosoviridescens</i>	Coleoptera	Longhorn beetle	Cherry Orchard Farm, on hogweed, vi.2012, T. Bantock and J. Kaunang
<i>Anacaena lutescens</i>	Coleoptera	Water beetle	Nonsuch Park, Balancing Pond, 28.iv.2007, P. Wilson
<i>Anthophora plumipes</i>	Hymenoptera	Bee	Nonsuch Park, 16.v.2004, J. Kaunang and R. D. Hawkins
<i>Bombylius major</i>	Diptera	Bee-fly	Nonsuch Park, Great Meadow, 28.iv.2007; Nursery site, 31.v.2014
<i>Centranthorhynchus barnevillei</i>	Coleoptera	Weevil	Warren Farm, 16.v.1998, I. Menzies
<i>Chrysolina oricalcia</i>	Coleoptera	Leaf beetle	Nonsuch Park, 16.v.1998, R. D. Hawkins and D. Lonsdale
<i>Clytus arietus</i>	Coleoptera	Wasp beetle	Warren Farm, 16.v.2004, J. Kaunang and R. D. Hawkins
<i>Colletes hederae</i>	Hymenoptera	Ivy bee	Warren Farm, 13.ix.2012, G. A. Collins
<i>Didea fasciata</i>	Diptera	Hoverfly	Nonsuch Park, 5.v.1989, R. K. A. Morris (Surrey Hoverfly Atlas)
<i>Dolycoris baccarum</i>	Hemiptera	Sloe bug	Warren Farm, 16.v.2004, J. Kaunang and R. D. Hawkins
<i>Galeruca tanaceti</i>	Coleoptera	Leaf beetle	Warren Farm, 16.v.1998, R. D. Hawkins, larva on yarrow, reared to adult
<i>Harmonia axyridis</i>	Coleoptera	Harlequin ladybird	Nonsuch Park, on sycamore, Great Mead, 8.x.2006; on oak, Great Mead, 28.iv.2007; by Balancing Pond, 31.iv.2014
<i>Hetergaster urticae</i>	Hemiptera	Nettle bug	Nonsuch Park, ivy on outside of garden wall, Mansion House, 16.v.2004, J. Kaunang and R. D. Hawkins
<i>Hydroporus angustatus</i>	Coleoptera	Water beetle	Nonsuch Park, Balancing Pond, 28.iv.2007, P. Wilson
<i>Ischnodes sanquinicollis</i>	Coleoptera	Click beetle	Near Banqueting House, Ewell Road, larva in dead trunk of horse chestnut, reared by J. Owen, in litt., 1995
<i>Ischnomera caerulea</i>	Coleoptera		Warren Farm, 16.v.1998, A. Hatch, seen previously at this site in 1976 by J. Owen. RDB 3, Rare (Denton 2005)

<i>Leptothorax nylanderi</i>	Hymenoptera	Ant	Banqueting House, in leaf litter, 16.v.1998, M. Fox
<i>Lucanus cervus</i>	Coleoptera	Stag beetle	Warren Farm, 16.v.1998, D. Lonsdale
<i>Magdalais armigera</i>	Coleoptera	Weevil	Cherry Orchard Farm, on elm, 16.v.1998; Warren Farm, 16.v.1998, R. D. Hawkins and D. Lonsdale
<i>Meconema meridionale</i>	Orthoptera	Southern oak bush cricket	Ewell Road, adjacent to Warren Farm, roadside, 23.ix.2013, R. D. Hawkins (who first recorded it from Britain in 2001)
<i>Meligramma trianguliferum</i>	Diptera	Hoverfly	Nonsuch Park, 22.v.1990, R. K. A. Morris (Surrey Hoverfly Atlas)
<i>Nephus quadrimaculatus</i>	Coleoptera	Small ladybird	Nonsuch Park, on ivy, 16.v.1998, R. D. Hawkins and D. Lonsdale, again 16.v.2004. RDB 2, Local, increasing
<i>Oedomera nobilis</i>	Coleoptera	Flower beetle	Warren Farm, 5.vi.2005, J. Chatfield
<i>Orella falcata</i>	Diptera		Warren Farm, larva on roots of goat's-beard, 16.v.1998, BENHS field meeting
<i>Pentatoma rufipes</i>	Hemiptera	Forest bug	Nonsuch Park, near Cheam Gate, last instar on lime, 15.v.2008, J. Kaunang ; London Road near Wickham Avenue, 2010, J. Chatfield
<i>Phytomyza ilicis</i>	Diptera	Holly leaf-miner	Nonsuch Park, The Wood, leaf mine, 12.iv.2014
<i>Pipiza luteitarsis</i>	Diptera	Hoverfly	Warren Farm, 16.v.1998, G. A. Collins
<i>Podops inuncta</i>	Hemiptera	Turtle bug	Warren Farm, 16.v.2004, J. Kaunang and R. D. Hawkins
<i>Stenamma [westwoodi]</i> For taxonomy see Pontin (2005)	Hymenoptera	Ant	Banqueting House, in leaf litter, 16.v.1998, M. Fox
<i>Tychius stephensi</i>	Coleoptera	Weevil	Warren Farm, 16.v.1998, I. Menzies

TABLE 9. Additional records of plant galls.

Scientific name	English name	Host plant	Gall organism	Location and date
<i>Aceria fraxinivora</i>	Rust gall	Ash	Mite	Nonsuch Park, The Wood, on ash keys, 17.iv.2013
<i>Andricus aries</i>	Ram's-horn gall	Oak	Gall wasp	Nonsuch Park, trees in valley by Round Pond to The Wood, 20.ix.2010
<i>Andricus grossulariae</i>	Hedgehog and blackcurrant gall	Oak and Turkey oak	Gall wasp	Nonsuch Park
<i>Andricus lucidus</i>	Hedgehog gall	Oak	Gall wasp	Nonsuch Park, trees in valley by Round Pond,
<i>Cynips longiventris</i>	Striped pea gall	Oak	Gall wasp	Nonsuch Park, near The Wood, 12.vii.2012
<i>Dasyneura urticae</i>	Nettle blister gall	Stinging nettle	Gall midge	Nonsuch Park, 7.x.2012
<i>Eriophyes prunispinosa</i>		Blackthorn	Mite	Warren Farm, 12.vii.2010
<i>Eriophyes similis</i>	Pimple gall	Blackthorn	Mite	Warren Farm, top of Sleepy Field, 14.vii.2013
<i>Eriosoma lanuginosum</i>	Elm bladder gall	Common elm	Mite	Nonsuch Park, near The Wood, 12.vii.2012, as old black form 21.iv.2013, B. M. Spooner; Warren Farm, 2004, J. Kaunang
<i>Pseudomonas syringae</i> <i>pv. savastanoi</i>	Canker	Ash	Bacterium	Nonsuch Park, 21.iv.2013, B. M. Spooner
<i>Psylla buxi</i>	Box sucker	Box	Homopteran bug	Nonsuch Park, 21.iv.2013, B. M. Spooner
<i>Taphrina pruni</i>	Pocket plum	Blackthorn	Fungus	Nonsuch Park, London Road Plantation, Sparrow Farm Road gate, iv.2014
<i>Urophora jaceana</i>		Common knapweed	Tetritid fly	Nonsuch Park, 21.iv.2013, B.M. Spooner

Book review

How snakes work. Structure, function, and behaviour of the world's snakes. Harvey B. Lillywhite. Oxford University Press (USA). 2014. 241 pp., A4 hardback. £35. ISBN 978 0 19 538037 8.

Chapters cover evolutionary history, feeding, digestion and water balance, locomotion, temperature and ectothermy, structure and function of skin, circulation and respiration, sense organs and perception, sound production, courtship and reproduction.

An exploratory book that is trying to provide a more readable introduction to an area of huge diversity and variation. However, in a subject where much can be said about variation, it is an often relatively generalized and selective account of many aspects of snake physiology, mostly related to basic anatomy. Extent of treatment and examples are varied and do not always try to give across-the-board coverage. Observations are sometimes not related to extensive often well-known published ecological studies that have been undertaken, and this might suggest a lack of reference to certain types of literature that may help explain function and behaviour. There are also a fair number of blind spots on certain topics. A smattering of findings that seem original and nicely illustrated come, to a certain extent, to the rescue.

The book is perhaps much less dry than other authoritative summaries, and might be of some use as part of an introduction for beginners with a basic grounding in biology.

TOM LANGTON

London butterfly monitoring report for 2013

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Abstract

Data from over twenty sites in London, monitored using the transect walks method, were used to calculate collated indices for 2013 and to enable comparisons with previous years. Species accounts were supplemented by records from other sites, surveys and observations.

Introduction

Monitoring of butterflies provides information on changes in the abundance of species between years. Comparison is possible for individual sites; and data can be collated to provide indices of abundance for a region or particular habitats. Results are presented in this paper for London, defined here as the Greater London area. In London monitoring commenced in 1978 and this paper presents an update for 2013. Other records of butterflies from London and from the wider London Natural History Society (LNHS) recording area are noted.

Methods

Butterflies were monitored along transects by use of the standard method of the UK Butterfly Monitoring Scheme. This is described at www.ukbms.org but see also Pollard and Yates (1993), and Crawford (1991) for an introduction to the use of collated indices in wildlife monitoring; and Williams (2000) for details on the application of the method in London. The objective was to collate the raw counts from numerous transect sites into indices that can indicate changes in abundance.

A transect at each site comprised a set route, though of differing lengths between sites, walked weekly between April and September inclusive, and within a standard range of weather conditions conducive to butterfly flight. Counts were made of the number of adult butterflies observed to provide a total for each species for the year at each transect. Providing that a transect had good coverage, estimates can be made for weeks missed due to poor weather or the unavailability of the recorders. However, if too few weeks were walked, it was difficult to calculate estimates and the transect was not included in the indices for that year. To contribute to the indices, data from each transect must be available for at least two years, though these do not need to be consecutive.

Estimates of the relative changes in the populations of each species from year to year are given by the difference in the indices. For example, a species with an index of 50 in one year and 25 in the following year would have had approximately half the adult population in the second year as compared with the first year. Indices have been rounded to the nearest whole number and were

generally set at 100 in 1990 or the first year of record of a species: for a technical discussion see Crawford (1991). Reliability of indices increases with the number of transects. In the earlier years there were relatively few transects, for example one transect was walked in 1978, two in 1986, three in 1988 and eight in 1990. Reliability of the indices may be lower for species with low counts and/or local distribution in London. The 'Total count on transects' provides an indication of the size of the count from which the analysis was made in 2013 using the data from the transects included in the index for that year. Those figures included the estimated counts for missing weeks; but not data or estimates for transects that were not walked or that had insufficient data in 2013.

To date, twenty-two transects contributed data to the index in 2013, while data from other transects were also received. Transects that contributed data to the index in 2013, the years for which data were available and the Borough in which the transect was located were: **Hampstead Heath** (Camden) 1978–2013, **Fryent Country Park** (Brent) 1986–2013, **Beane Hill** (Brent) 1988–2013, four transects managed by the Corporation of London (located in the London Borough of Croydon): **Coulsdon Common** 1990–2011, 2013, **Farthing Downs** 1990–2013, **Kenley Common** 1990–2009, 2013, **Riddlesdown** 1990–2013; **Mitcham Common 'route A'** (Merton) 1994–2001, 2003–2013, **Wildfowl and Wetlands Trust Wetland Centre at Barn Elms** (Richmond upon Thames) 1996–2013, **Railway Fields** (Haringey) 1997–2013, **Hutchinson's Bank Nature Reserve** (Croydon) 1997–2013, **South Norwood Country Park** (Croydon/Bromley) 1998–2013, **Tower Hamlets Cemetery Park** (Tower Hamlets) 1999–2013, **Gunnersbury Triangle** (Hounslow) 1999–2013, **Brent Reservoir** (Barnet/Brent) 2000–2013, **Riddlesdown Quarry** (Croydon) 2001–2005, 2008–2013, **Kenwood Estate** (Camden) 2005–2013, **Horsenden Hill East** (Ealing) 2005–2013, **Horsenden Hill West** (Ealing) 2005–2013, **Perivale Wood** (Ealing) 2005–2013, **Hounslow Heath B** (Hounslow) 2010–2013, and **Sydenham Hill Wood** (Southwark) 2010–2011, 2013.

Additional results were available from **Parkland Walk South** (Haringey) which was walked for the second year, from **West Wickham** (Bromley), and from a first year transect at the **Dennis Bland Nature Reserve** (Barnet). Transects walked but with too few weeks to be included in the indices were **Bedfont Lakes** (Hounslow), **Cranford Park** (Hounslow), and **Lake Farm Country Park** (Hilllingdon). Recorders for 2013 are listed in the Acknowledgements. For some sites, the indices have been updated with data from earlier years that were not available previously.

Transects beyond Greater London but within the LNHS area are not included in these collated indices and reference should be made to the respective county data and reports produced by Butterfly Conservation, for example, Wood (2014). However, where appropriate the species accounts include records from any source from the wider LNHS area, in addition to those from within the Greater London area.

The London transects contribute towards the national indices of the UK Butterfly Monitoring Scheme and for results up to 2012, refer to Botham et al. (2013). Records also contribute towards the data held by Greenspace Information for Greater London (GiGL).

Gardens represent a significant area and variety of the 'habitat' available in London. Figures 1 and 2 illustrate some design features that are of benefit to butterflies.

Results

The order and nomenclature of the species accounts follow Asher et al. (2001). The accounts are based on the collated indices that commenced in 1978, and which for the years 2003 to 2013 are presented in Table 1. Some year-to-year variation is to be expected, so the comments are focused on the more pronounced changes and on longer-term trends

SMALL SKIPPER *Thymelicus sylvestris* and ESSEX SKIPPER *Thymelicus lineola*

Small and Essex skippers are generally counted together by transect walkers due to the difficulty of separately identifying the two species while they are in flight. Both are dependent on rough grassland habitat. The 2013 index increased on that of recent years, and was the highest since 2006. At fourteen transects, recorders identified some of the individuals to species; and while the small skipper was present at all of those sites, the Essex skipper was identified at seven sites. Of those 114 skippers, 74 per cent (84) were small skippers and 26 per cent (30) were Essex skippers. In general, both species appear to have declined in London since the 1980s and 1990s. Total count on transects: 1,373.

LARGE SKIPPER *Ochlodes sylvanus*

In London the large skipper was associated with rough grassland and scrub. Populations of this species have declined during recent decades. At some sites where it was previously frequent, for example Fryent Country Park, there have been few recorded during recent years. Total count on transects: 317.

DINGY SKIPPER *Erynnis tages*

The typical habitat of the dingy skipper is of short grassland containing the larval food plants, with some bare patches and taller vegetation to provide shelter and roosting areas (Asher et al. 2001). In London the species is effectively confined to chalk grassland sites on the southern edge such as at Hutchinson's Bank Nature Reserve and Riddlesdown Quarry. Counts were relatively high at both sites in 2013 resulting also in a high index for this species. Total count on transects: 122.

GRIZZLED SKIPPER *Pyrgus malvae*

Habitat for the grizzled skipper is unimproved grasslands containing spring nectar plants and the larval food-plants, preferably with bare patches and taller vegetation (Asher et al. 2001). In London the species is effectively confined to a few chalk grassland sites on the southern edge: in 2013 the transect records were from two sites. Total count on transects: 20.

CLOUDED YELLOW *Colias croceus* (Figure 3)

Four transects recorded the migratory clouded yellow with the numerically highest count from Hutchinson's Bank Nature Reserve and the others at Riddlesdown, the London Wetland Centre and Farthing Downs. Sample sizes for the clouded yellow tend to be relatively small, but on the basis of the index figures for London, the 2013 migration appeared to be higher than for that of 2006 and the highest since the larger migration in 2000. In London, the migration was first recorded in the week commencing 17 June 2013, with larger numbers evident during the weeks commencing 29 July to 2 September



FIGURE 1. A back-garden lawn in Wembley with areas maintained at two cutting heights to provide for wildlife. The lawn is long established with species appearing to be a mix of the original lawn, plus self-sown species and a few introductions. They include common bird's-foot trefoil *Lotus corniculatus*, common sorrel *Rumex acetosa* and ox-eye daisy *Leucanthemum vulgare*. No herbicides or fertilizers are used on the lawn.

Photo: Leslie Williams



FIGURE 2. Roe Green Walled Garden, Kingsbury, a wildlife garden managed by Barn Hill Conservation Group within a Brent Council park. The Walled Garden demonstrates a range of habitats and features. Illustrated here is a raised bank of soil planted with wild and naturalized plants.

Photo: Leslie Williams

2013. Other records of clouded yellow were from Bedfont Lakes Country Park; and outside of Greater London but within the LNHS area from Woodmansterne, Surrey. Total count on transects: 49.

BRIMSTONE *Gonepteryx rhamni*

The index in 2013 was the highest for London since comparable indices for the species commenced in 1990 though that for 1992 was almost as high; and up from the lowest in the series in 2012. The brimstone remained widespread and there were records from most of the sites within urban London where it had established since the early 1990s. The planting and subsequent growth of the main larval food plants, particularly alder buckthorn *Frangula alnus* and on drier soils, common buckthorn *Rhamnus cathartica*, has facilitated the establishment of new populations. Brimstones were also recorded in a residential area at Greenford (TQ160850), and from Alexandra Park. Brimstones were recorded flying in London in each of the months of March to September 2013. Total count on transects: 1,018.

LARGE WHITE *Pieris brassicae*

The large white ranges widely but is associated with locations where the larval food plants occur, and particularly in agricultural areas where *Brassica* field crops are grown, and in urban areas with gardens and allotments. In 2013 it was recorded from all transects. Total count on transects: 1,344.

SMALL WHITE *Pieris rapae*

Associated with *Brassica* plants, the small white is noted for laying eggs on crops and in gardens. Recorded on all transects, though some transect records appear to include counts for the green-veined white. The index for London was the highest since 1997. Total count on transects: 2,496.

GREEN-VEINED WHITE *Pieris napi*

The green-veined white occurs particularly in damp grassland, and alongside hedgerows, woodland, ditches and water where wild crucifer food plants grow. Total count on transects: 1,144.

ORANGE TIP *Anthocharis cardamines*

A species of damp meadows, hedgerows, woodlands, roadsides and waterside habitats where crucifer food plants occur, in particular cuckooflower *Cardamine pratensis* and garlic mustard *Alliaria petiolata*. Orange tips were widespread in London, and were recorded on all transects. Total count on transects: 360.

GREEN HAIRSTREAK *Callophrys rubi* (Figure 4)

The green hairstreak is a species of unimproved grasslands with shrubs and scrub. Records were from two transects in south London. Wood (2014) reports on two records in the vicinity of Bedfont Lakes Country Park, Hounslow. Total count on transects: 6.

BROWN HAIRSTREAK *Thecla betulae* (Figure 5)

Habitat for the brown hairstreak is hedgerows, scrub and woodland edges with blackthorn *Prunus spinosa*. Populations tend to be local; a record was from Bookham Common on 21 August 2013. Total count on transects: 0.

TABLE 1. Collated indices for butterfly species in London, 2003–2013. Indices have been rounded to the nearest whole number and have usually been set at 100 in 1990 or the first year of record, though indices may be set at 100 in other years or at a different figure where this aids interpretation. A blank indicates that the species had not yet been recorded on any transect in London. A zero indicates that a species was not observed on transects in that year but had previously been observed on a transect in London.

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Small and Essex skippers	72	75	78	74	61	60	63	33	38	30	72
Large skipper	84	56	60	48	44	27	63	50	66	30	48
Dingy skipper	104	69	56	26	14	15	30	39	80	63	137
Grizzled skipper	40	80	20	26	44	65	113	28	109	32	82
Clouded yellow	121	108	0	554	23	91	310	0	0	0	1,261
Brimstone	75	106	104	97	69	72	132	83	120	58	182
Large white	120	153	168	152	75	125	324	116	95	56	237
Small white	183	266	215	194	197	158	240	177	274	144	318
Green-veined white	74	94	64	56	49	47	94	49	93	41	57
Orange tip	42	62	74	50	34	38	76	80	122	78	71
Green hairstreak	80	116	71	44	101	76	82	61	239	53	47
Purple hairstreak	181	267	450	326	308	405	467	521	389	102	200
White-letter hairstreak	12	8	60	96	21	26	71	66	23	12	30
Small copper	58	50	21	58	50	32	50	49	43	28	41
Small blue	46	69	137	485	287	195	365	1,325	3,210	378	1,112
Brown argus	25	25	11	26	19	12	17	37	57	5	23
Common blue	149	65	56	120	34	43	94	136	57	23	132
Chalkhill blue	39	89	29	128	10	3	10	8	32	73	203
Holly blue	43	64	73	41	72	63	24	43	56	41	30
White admiral	0	100	0	0	0	100	0	100	300	100	0
Purple emperor			100	0	0	0	0	0	0	0	0
Red admiral	422	131	162	373	389	140	142	150	255	268	63
Painted lady	379	36	3	230	36	4	1,009	18	3	13	16
Small tortoiseshell	67	144	52	26	12	5	10	24	31	8	46
Large tortoiseshell							100	0	0	0	0
Peacock	377	574	495	306	388	305	829	616	277	175	457
Comma	210	155	128	235	119	121	314	143	101	76	195
Dark green fritillary	91	9	4	0	0	0	11	7	22	15	85
Silver-washed fritillary	0	0	125	500	0	0	125	790	902	0	620
Glanville fritillary									100	214	43
Speckled wood	229	138	146	130	121	187	234	127	162	121	127
Marbled white	35	24	12	35	32	52	57	34	45	60	73
Gatekeeper	161	204	243	195	154	149	184	165	169	178	179
Meadow brown	138	114	151	131	77	84	80	51	75	121	121
Ringlet	366	213	159	195	133	246	303	258	254	262	425
Small heath	10	8	12	10	12	7	10	14	46	29	27



FIGURE 3. Clouded yellow at Hutchinson's Bank Nature Reserve, 21 June 2013.

Photo: Martin Wills



FIGURE 4. Green hairstreak at Hutchinson's Bank Nature Reserve, 4 June 2013.

Photo: Martin Wills

PURPLE HAIRSTREAK *Neozephyrus quercus*

Colonies of the purple hairstreak are associated with oak (*Quercus* spp.). Purple hairstreaks generally fly during the evening; and compared with other species is possibly under-recorded on transects which are walked during the day. Purple hairstreaks were also recorded away from the transects at Horsenden Hill and Perivale Wood; at Ruislip Woods, at West Wickham, Osterley Park; Alexandra Park; and beyond the Greater London area at Bookham Common. Total count on transects: 60.

WHITE-LETTER HAIRSTREAK *Satyrium w-album*

White-letter hairstreaks use elm *Ulmus* spp. for breeding, and with the loss of mature elm trees in the 1970s, the butterfly is now associated in London with younger elm trees that have grown from suckers in hedgerows and woodland edges. There were transect records from the Brent Reservoir and from both of the Horsenden Hill transects. Total count on transects: 12.

SMALL COPPER *Lycaena phlaeas*

Dry, unimproved grassland is the main habitat for the small copper, particularly where the main larval food plants, common sorrel *Rumex acetosa* and sheep's sorrel *R. acetosella*, occur. Distribution and abundance have declined in London since the 1990s. Total count on transects: 183.

SMALL BLUE *Cupido minimus* (Figure 6)

The small blue is dependent upon the sole food plant, kidney vetch *Anthyllis vulneraria*; and in London is effectively confined to some chalk grassland sites on the southern edge. Total count on transects: 97.

BROWN ARGUS *Aricia agestis*

While calcareous grassland is considered to be the typical habitat, the brown argus also occurs on other dry grasslands. For 2013 records were primarily from transects in the south but also from Horsenden Hill and the north-western edge of London. There was also a record from Darlands Lake in the Totteridge Valley, Barnet, at TQ2493. Total count on transects: 35.

COMMON BLUE *Polyommatus icarus*

The common blue is a species of grassland habitats and the main food plant is common bird's-foot trefoil *Lotus corniculatus*, though some other legume species are also used. Total count on transects: 1,473.

CHALKHILL BLUE *Polyommatus coridon*

Calcareous grassland with the food plant, horseshoe vetch *Hippocrepis comosa* is the habitat of the chalkhill blue. It was recorded at three transects on the southern edge of London in 2013; while the index was the highest since that of 1997. North of Greater London but within the LNHS recording area there was a record from near Elstree (Wood, 2014). Total count on transects: 145.

HOLLY BLUE *Celastrina argiolus*

The holly blue is a widespread species dependent upon the presence of the larval food plants, particularly ivy and holly. As such it is the blue butterfly that



FIGURE 5. Brown hairstreak at Bookham Common, 21 August 2013. *Photo: Martin Wills*



FIGURE 6. Small blue at Hutchinson's Bank /Chapel Bank Nature Reserve, 31 May 2013.
Photo: Martin Wills

can best adapt to urban areas; and in London appeared more a butterfly of open woodland and green spaces in urban London than at sites in areas of countryside. Total count on transects: 220.

WHITE ADMIRAL *Limenitis camilla*

The white admiral is a butterfly of woodland and uses honeysuckle *Lonicera periclymenum* as the food plant. Five white admirals were recorded from Ruislip Woods on 27 July 2013 by Neil Anderson (LNHS Newsletter 230: 22). In the wider LNHS recording area, fifteen white admirals were recorded at Bookham Common (TQ132567) by Andrew Culshaw on 25 July 2013. Total count on transects: 0.

PURPLE EMPEROR *Apatura iris*

The habitat of the purple emperor is broad-leaved woodland where goat willow *Salix caprea*, or grey willow *S. cinerea* occur, and it prefers larger woodlands or a landscape with numerous smaller woods and scrub. While none were recorded on London transects in 2013, it was recorded from Ruislip Woods on 27 July 2013 by Neil Anderson (LNHS Newsletter 230: 22). In the wider LNHS recording area, a single purple emperor was recorded at Bookham Common (TQ132567) by Andrew Culshaw on 25 July 2013. Total count on transects: 0.

RED ADMIRAL *Vanessa atalanta*

The red admiral is a migratory species from Continental Europe and North Africa, but may then breed in Britain to produce a summer generation, with some remaining to overwinter as adults. In 2013 there were London records in each of the months of April to November inclusive, though it was a poor year for this species in London; the nearest comparable index being that for 1991. They were however widespread, with records as central as St James's Park. Total count on transects: 51.

PAINTED LADY *Vanessa cardui*

A migrant from North Africa, the painted lady may occur in any habitat and will seek thistles as nectar sources and as the larval food plant. The painted lady was also recorded from St James's Park; and on some of the transects. Numbers fluctuate greatly from year to year, as can be seen from Table 1. Total count on transects: 13.

SMALL TORTOISESHELL *Aglais urticae*

The small tortoiseshell occurs in a range of habitats including urban areas, and will seek the common nettle *Urtica dioica* and the small nettle *U. urens* as larval food plants. In London populations declined from about 2000, though the index for 2013 was however the best since that of 2005. Total count on transects: 152.

PEACOCK *Inachis io*

Woodland paths, hedgerows, and gardens are habitats for the peacock though they may occur elsewhere seeking nectar plants or the common nettle *Urtica dioica* for egg laying. Total count on transects: 506.

COMMA *Polygonia c-album*

The comma has a preference for hedgerows, woodland edges and gardens and is widespread throughout London. It was recorded on all transects in 2013. Total count on transects: 507.

DARK GREEN FRITILLARY *Argynnis aglaja*

The dark green fritillary is a butterfly of grasslands, light scrub and other open habitats. Various species of violet *Viola* are the larval food plants. Within the transect sites, Hutchinson's Bank Nature Reserve accounted for the large majority of the records. Numbers were higher at this transect than during recent years; and this was reflected too in the highest index since 2003. One was recorded at Horsenden Hill West. There was also a record from Osterley Park (TQ146780) on 27 July 2013. Total count on transects: 23.

SILVER-WASHED FRITILLARY *Argynnis paphia*

The silver-washed fritillary has a preference for broad-leaved woodland in which the common dog-violet *Viola riviniana* grows though the adult butterflies are typically found along sunny paths and in glades. In 2013 the silver-washed fritillary was recorded at Farthing Downs and at Hutchinson's Bank Nature Reserve. Beyond Greater London but within the wider LNHS recording area, twenty adults were recorded at Bookham Common by Andrew Culshaw on 25 July 2013. Total count on transects: 5.

GLANVILLE FRITILLARY *Melitaea cinxia*

In Britain the Glanville fritillary is a species now largely restricted to coastal landslips on the Isle of Wight and the Channel Islands. In London the species had recently established at one site, possibly through reintroduction (see Willmott et al. 2013 for some related background). Total count on transects: 3.

SPECKLED WOOD *Pararge aegeria*

Typically found along paths and in glades in woodland or flying in partial shade, the larval food plants of the speckled wood are various grasses. Speckled woods can also be seen in small green spaces and gardens within urban London. Recorded on all transects. Total count on transects: 1,737

MARBLED WHITE *Melanargia galathea*

The habitat of the marbled white is unimproved, rough grassland preferably containing red fescue *Festuca rubra*. While the marbled white is more a species of the countryside, populations have established at some green spaces in urban London during recent years. These include the Brent Reservoir and Horsenden Hill. While the index was the best since 1997, trends for individual sites have differed. In 1997, almost all of the count was from one site, and that count had declined by 2013; whereas several sites, both countryside and of urban London have since seen marbled whites establish populations and increase. Records were also received from Darlands Lake / Totteridge valley, Barnet; Stanmore Country Park, Harrow; Perivale Wood, and one each from the Dennis Bland Nature Reserve, Fryent Country Park and from Roe Green Walled Garden. Total count on transects: 655.

GATEKEEPER *Pyronia tithonus*

Two English names for this species, gatekeeper and hedge brown, aptly describe the typical habitat of hedgerows, woodland edges and paths, rough grassland and scrub. The gatekeeper is widespread in London. Total count on transects: 2,641.

MEADOW BROWN *Maniola jurtina*

The meadow brown prefers more-open areas than the hedge brown with rough grassland or hay meadows, particularly where the management is conducive to the growth of the larval grass food plants. Recorded on almost all transects in 2013, it was more a species of semi-natural green spaces than of urban areas. Away from the transects, it was recorded also at Lordship Recreation Ground, Tottenham. Total count on transects: 9,613.

RINGLET *Aphantopus hyperantus*

The ringlet is a species of rough grassland in and near to woodland. While the ringlet is commonly found on chalk grassland sites on the southern edge of London, the 2013 index benefited from a large increase at Mitcham Common route A where a population had established since 2006. That made for the highest London index since 2000. Other transect sites within urban London with ringlets in 2013 included the Brent Reservoir, South Norwood Country Park, Horsenden Hill West, the London Wetland Centre and Hampstead Heath. At Tower Hamlets Cemetery Park, the ringlets were the first recorded since 2006 and were noted both during the recorded transects and at other times. In the north of the Greater London area, ringlets were also present at the Dennis Bland Nature Reserve; Darlands Lake / Totteridge valley, Barnet; Bethune Park at Friern Barnet; Oak Hill Woods; Dollis Valley Green Walk at Whetstone and at Totteridge; and from Stanmore Country Park, Harrow. Other records of the ringlet were from West Wickham. Total count on transects: 1,352.

SMALL HEATH *Coenonympha pamphilus*

The small heath occurs in short, well-drained grasslands, where the larval food plants of fine-leaved grass species occur. Populations were present at chalk grassland sites on the southern edge of London, but also from Richmond Park in west London. Within the wider LNHS recording area there were records too from Chingford (TQ3895), and from West Wickham. Total count on transects: 407.

The following species were recorded in London during 2013 but are considered to be escapes or releases from captive populations:

MONARCH *Danaus plexippus*

One was recorded, and photographed by Meg Palmer, in a garden at Twickenham (TQ 16513 74285) on 6 June 2013. Although this North American migratory species does occasionally reach Britain in September or October, this individual was out of season and is considered to be an escaped or released captive-bred specimen.

Heliconius spp.

A butterfly of this genus, either *Heliconius erata* a small/red postman, or the closely related *H. melpomene* the postman, was photographed by Tony Donetti

near Northwick Park Station (TQ166880) on 4 August 2013. These are species of southern / central America and this individual is considered to have been an escape.

Discussion

While this report attempts to provide a summary of the changes in abundance of butterflies in London for 2013, population sizes vary naturally from year to year. Hence the report avoids emphasis on annual changes but attempts to highlight the longer-term trends. Nevertheless, although the previous year, 2012, was notable for high rainfall during the summer, and low indices for many, 2013 evidenced a recovery in the populations of some of those species.

Thirty-six species of butterfly were recorded in London in 2013 in addition to two species considered to have been released from or to have escaped from collections.

This report is concerned with population (or abundance) change and does not directly cover the distribution of butterflies in London. For Greater London and the LNHS recording area maps were produced by Plant (1987), though as Fox and Williams (2006) reported and is apparent from the transect monitoring, there have been large changes in the distribution of some species in London since the mid 1980s. Where the London Area overlaps that of adjacent counties, more-recent distribution maps are available in Willmott et al. (2013) covering Surrey; and in Wood (2014) covering Middlesex and Hertfordshire.

Nationally the UK Butterfly Monitoring Scheme introduced an innovation during 2013 using online recording.

Acknowledgements

Transect walkers in 2013 included the following and apologies to others, as the names of some recorders were not available at the time of writing: Richard Bullock at Wildfowl and Wetlands Trust Wetland Centre at Barn Elms; Martin Wills at Hutchinson's Bank Nature Reserve; Alison Shipley at Cranford Park; Martin Bridge at South Norwood Country Park; Terry Lyle at Tower Hamlets Cemetery Park; Andrew Self and Roy Beddard at the Brent Reservoir; Mike Taylor at Kenwood Estate; Andrew Culshaw, David Howdon and others at the Horsenden Hill and Perivale Wood transects; Richard Featherstone, Harry Lines and Rob Solomon at Hounslow Heath B; Kayla Terry, Richard Featherstone and Rob Solomon at Bedfont Lakes Country Park; Alison Shipley at Lake Farm Country Park; Linda Douthwaite at Parkland Walk south; and Michael Berthoud, Simon Mercer and Leslie Williams at Fryent Country Park and Beane Hill.

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The co-operation with the county coordinators for Butterfly Conservation is noted in particular from Andrew Wood for Hertfordshire and Middlesex. Dr Dave Dawson had previously advised on the statistical method for the collations and the programming of the spreadsheets. Simon Mercer helped develop the series of linked spreadsheets.

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Book review

Methodus Plantarum Nova. John Ray (1682). Translated into English by Stephen A. Nimis, Kathleen Tschantz Unroe, Michael A. Vincent. The Ray Society, London. 2014. 182 pp., 240 × 160 mm, hardback. £60 (less to Ray Society members). ISBN 978 0 903874 46 5.

It may come as a surprise to learn that this is the first translation of this work by John Ray into English despite the fact that it occupies such an important place in the history of botany. Hitherto it has only been available in its original language, Latin.

Readers of this journal will be aware of the importance of John Ray (1627–1705), the son of an Essex blacksmith, as one of the pre-eminent naturalists of his time as a result of his pioneering work on plants. He has been called the ‘Father of Natural Historians’, the ‘Father of English Botany’, and the ‘English Linnaeus’. Linnaeus honoured Ray by publication of the generic name *Rajania* (Dioscoreaceae) from South America. Ray published many prominent botanical works, the first in 1660 being his catalogue of Cambridge plants — one of the first local floras ever published, and certainly the first British local flora, a recent translation of which into English was reviewed in this journal two years ago (*LN* 91).

The pioneering work of our early naturalists is a far cry from the present-day classifications based increasingly on evidence from studies of DNA. Ray’s concepts were focused on dividing plants based on seed leaves — monocotyledons and dicotyledons, the difference between flowering and flowerless plants, the use of the term ‘petal’ to designate the ‘leaf’ of the flower, and the use of stamens and pistils in plant classification, anticipating the direction of Linnaeus. Ray published six rules of plant classification, the first such ever published. Were it not for the innovative use of binomials by Linnaeus, John Ray might have been more widely remembered as the ‘Father of Plant Taxonomy’.

Following the introductory sections outlining Ray’s impact on the development of plant taxonomy, a modern perspective on his classification, his studies on seeds, and the Translators’ Preface, from page 27 on is the translation itself. It is a detailed commentary on the observations of a field naturalist possessing great powers of perception at a time when the study of natural history, as we ourselves have come into it largely already sorted for us, just did not exist. It is a fascinating read. You can almost feel the specimens as he examines and classifies them.

Details of membership of the The Ray Society (Registered Charity No. 208082) may be obtained by writing to The Honorary Secretary, The Ray Society, c/o Natural History Museum, London SW7 5BD.

Ray Society publications are available through booksellers or direct from the Society’s agents, Scion Publishing Ltd, The Old Hayloft, Vantage Business Park, Bloxham Road, Banbury OX16 9UX; www.scionpublishing.com

K. H. HYATT

Spider records for 2012 and 2013 for the London Area (counties of London and Middlesex)

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Abstract

New and interesting spiders found during 2012 and 2013 are listed, together with an account of spider activities during each year. There were no new records during the cool, damp summer of 2012, but in 2013, partly due to increased collecting effort by additional contributors, three new records for the old county of London and five for Middlesex were noted, while another new record for Middlesex found some years ago was reported for the first time.

Introduction

In London and Middlesex (December to December) 201 species were recorded in 2013 but only 126 in 2012. The difference was in part due to the wet cool summer in 2012, although even in 2013 the long cold spring must have affected invertebrate populations, while later on the summer was warm and dry. Partly the numbers reflect additional collecting effort in 2013 by a number of colleagues including Colin Plant and Dr Jonty Denton in areas of west and south-west Middlesex not visited by the author. There were no new records for the two counties in 2012, but in 2013 there were three new records for London and five for Middlesex, two of them contributed by Jonty Denton (Denton 2012, 2013), who also contributed an old record of *Meta menardi* which is included in the Middlesex list for the first time.

In the account below, all the records not otherwise credited are by the author. Nomenclature and the order of families are according to Merrett et al. (2014).

Spider activities in 2012 and 2013

2012

There was no Society summer spider foray this year owing to the pressure of the recorder's family commitments.

A family fun day at Queen's Wood on 17 June included two short spider forays for children which were certainly great fun and surprisingly produced one spider new to the wood (where trapping and collecting have been conducted by the author since 1989), *Araneus sturmi*, which was also found for the first time in Mile End Park this year.

On 27 June there was a one-day biodiversity conference at Mile End Park, in the course of which specimens of the 'Mile End spider' (*Macaroeris nidicolens*) were found on the black pines, and the changes taking place on the Petrol Station Meadow as a result of changes in the mowing regime were explained. This meadow has recovered from having virtually nothing but 'recreation-ground spiders' (to quote Dr Eric Duffey) in the course of five years to having virtually no pioneer species but a normal acid grassland assemblage. A detailed report of the changes on this meadow was published in the last *London Naturalist* (Milner 2013b).

During a rather damp spider foray for the Heath and Hampstead Society on 6 October a meagre selection of spiders was seen, and it was noted that there appeared to be fewer *Atypus affinis* webs than usual on the slopes above the Vale of Health.

2013

The Society's annual spider foray on the afternoon of 2 May visited Pear Wood and meadows (London Borough of Harrow), when a small group of enthusiasts was shown around by the two wardens, Claire and Rosemary. The most spectacular find was a large female *Marpissa muscosa* found (and photographed) on the bark of a dead oak tree. This is a fine spider; our biggest jumping spider, yet strangely elusive (Figure 1).



FIGURE 1. Female *Marpissa muscosa* (family Salticidae), $\times 6$, a large jumping spider recorded from scattered localities in the London Area, and often found under dead bark, on wooden fencing, etc.

Photo: Mick Massie

Earlier on the morning of the same day, 2 May, the author led a foray on Hampstead Heath for the Heath & Hampstead Society which ended at the Vale of Health slopes where more *Atypus* webs were found than during the damp summer of 2012.

A 'bug hunt' for children took place at Bounds Green allotments on Thursday 6 May, and another in Queen's Wood on 9 August for the summer activity week at Our Lady of Muswell Hill Primary School; considerable interest and enthusiasm for spiders and 'creepy-crawlies' generally was raised. A foray for the Friends group at Bunhill Fields in the City on 30 August produced not only an adult *Pholcus phalangioides* but also a particularly fine male specimen of *Tegenaria gigantea*.

In January, following some local publicity resulting from a survey of potential bat roosts, the author was invited to investigate the burial vaults lining Egyptian Avenue in Highgate Cemetery as a number of 'large spiders' had been seen living there. Investigation revealed a substantial colony of the rare *Meta bourneti*, new to

London; altogether nearly fifty adults were counted, and this from no more than half the vaults (the others proved inaccessible as the doors were too rusty to open). Word went out and other bat persons reported finding large spiders living on webs in similar potential bat roosts such as undisturbed Victorian ice-houses, where the conditions were damp and stable. Some specimens were received which proved to be *M. bourneti* (from the ice-house at Marble Hill Park, Twickenham) while others were identified as *M. menardi* (from both the ice-house and the chalk mine at High Elms, Bromley). An illustrated report was published in the Newsletter of the National Spider Recording Scheme (Milner 2013a). Jonty Denton provided a record of a single male *M. menardi* which he had found inside a hollow beech tree at Bushy Park several years ago.

Pitfall trapping

2012

Pitfall trapping has continued at long-term sites in Queen's Wood, Mile End Park and Tower Hamlets Cemetery. Traps have been set in Pear Wood, Harrow which was threatened with development but saved as a result of a local campaign early in the year. Pitfall trapping has also been started at a site just west of Terminal Five, Heathrow, including a meadow area which was translocated at considerable cost from where the new terminal was built. So far the spider catches from this meadow (which looks like excellent damp grassland) have been somewhat disappointing. Further records may indicate how successful the translocation was, but unfortunately no baseline data from the original site were obtained.

2013

Due to pressure of other commitments, pitfall trapping has been terminated in Queen's Wood after more than twenty years, but continued at long-term sites in Mile End Park and Tower Hamlets Cemetery. Trapping at Colne River Biodiversity site west of Heathrow Terminal Five has continued for twelve months, but has not so far been extended.

New and interesting records

New county records: ** London, * Middlesex

Mermessus trilobatus (Linyphiidae) * **

A spider new to Britain, *Mermessus trilobatus* was first reported from one or two sites in the Thames Gateway in 2012 by Peter Harvey, the National Recorder; the species is apparently an invader from North America. A single male was trapped at Mile End Park (London) in January 2013, and another was trapped at the Colne Valley Biodiversity site (Middlesex) in June 2013; these are both new county records.

Meta bourneti (Tetragnathidae) * **

Both finds of the orb-web spinner *Meta bourneti* (at Highgate Cemetery, London and Marble Hill Park, Middlesex) were new county records (Milner 2013a).

Hypsosinga albovittata (Araneidae)*

Both sexes of this small orb-web spinner were swept from long grass at Home Park, Hampton Court Palace in 2013 by Jonty Denton (Denton 2013).

Zelotes apricorum (Gnaphosidae) **

A single male *Zelotes apricorum* was trapped at Highgate Cemetery in May 2013. This is a scarce spider in the London Area and all the previous records were from Middlesex; i.e. outer London. This is the first confirmed record for the old county of London.

Xysticus acerbus (Thomisidae) *

At the Colne Valley Biodiversity site both sexes of the rare crab spider *Xysticus acerbus* were trapped in June and July 2013 in mown grass at the edge of capped landfill; this is a new record for Middlesex. This species has only recently been recorded from two locations as a new record for Surrey (Denton 2012) not many miles from the Colne Valley site; possibly this may suggest that the species is spreading although what new ecological opportunities this reflects are not known.

Ozyptila nigrita (Thomisidae) *

A single male of this scarce crab spider was swept from long grass at Home Park, Hampton Court Palace by Jonty Denton in June 2013 (Denton 2013).

Other finds of note were the increasing numbers of *Megalepthyphantes* sp. (Linyphiidae), which has now been trapped frequently at Mile End Park, Tower Hamlets Cemetery Park, Victoria Park and Highgate Cemetery. This large money spider is increasing its range.

At Colne Valley Biodiversity site both sexes of the scarce *Drassodes pubescens* (Gnaphosidae) were trapped in dense grassland on capped landfill, along with *Haplodrassus signifer*, a species normally associated with undisturbed relic grassland.

Finally, several males of *Cicurina cicur* (Dictynidae) were trapped at Highgate Cemetery in October and November 2013. This is a scarce spider in London; it has been found at ten previous sites, but nearly always as single male individuals. Little is known of its habits.

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CORRIGENDUM

The following errors occurred in ‘Spiders and management of Clinton Road Meadow at Mile End Park, London Borough of Tower Hamlets, 2005–2012’ (*LN* **92**: 99–113):

1. On page 102 each graph had the words ‘Total number of species’ vertically along the X axis; this should be deleted.
2. The correct spelling of the Latin name for cock’s-foot (orchard grass) is *Dactylis glomerata*; incorrect spellings occurred on pages 99, 100, and 101.
3. On page 112 the correct spelling of the subspecies of *Vicia sativa* is *segetalis*.

Odonata report for 2012 and 2013

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Twenty-twelve was in total contrast to 2011 which had given us the earliest season on record with unseasonal temperatures and unlimited sunshine that April. During March 2011 it was officially announced that we were in a drought and water restrictions were implemented. For Odonata the problem was the drying up of water bodies and possibly the concentration of pollutants in decreasing volumes of water and reduced flow. But the irony: from April onwards the spring and much of the summer seemed to be a deluge and certainly April and June gave us record rainfall. When it wasn't raining it was often cool and windy. Not ideal for many insects, though at least the water bodies were replenished.

2012

Overall 2012 was a very average year for most of our regular species and some such as common darters *Sympetrum striolatum* seemed far from numerous at many sites. As is customary, large red damselfly *Pyrrhosoma nymphula* was the first species recorded this year with the earliest being one on 3 April at Rainham, compared with the first nationally in Cornwall on 25 March.

One of our scarcer, but increasing, species, the hairy dragonfly *Brachytron pratense* was first recorded at the London Wetland Centre on 30 April. Other sites recording this species included the Lea Valley, Wake Valley Pond, Thames Road wetlands at Crayford and a probable at Hampton Wick Pond, Home Park on 13 May. Given the lack of real confusion species this early in the season I'm confident the observer has correctly identified this specimen. It is generally expanding its range and turning up at new sites.

Small red-eyed damselfly *Erythromma viridulum*, a relatively recent colonist, is now almost taken for granted in our area. This year the species was possibly a couple of weeks later than normal emerging with the earliest record received on the 8 July at Greenwich Ecology Park. The highest count was of c.100 at Bedfords Park on 22 July by Colin Jupp. I also found c.50 on the fishing pools at Northala Fields, Northolt on 26 August.

Three male and three female scarce emerald damselflies *Lestes dryas* were also found at Bedfords Park on the 22 July and some were recorded here on subsequent dates. Also, records were received from Dagnam Park, near Romford. In our area this species is principally found in the grazing marshes of the Thames Estuary. It therefore came as a great surprise when James Owen discovered about seven on a pond on Blackheath. Supporting photos were received for confirmation and I'd also like to thank Roy Woodward for his opinions on this record. These are the first records from here or anywhere in London away from the aforementioned Thames marshes. In Norfolk it does occur inland at sites such as pingos. It will be interesting to see whether this species is refound next year at this site.

A feature of the last few reports has been the occurrence of the beautiful demoiselle *Calopteryx virgo* within our boundary. Despite the less than favourable conditions this year several records were again received. The first was a male seen on 30 May by Gavin Hawgood in a South Norwood garden

which was an obvious wanderer. In north London, Robert Callf reported a male on a couple of dates at Cuffley Brook. Perhaps the most astonishing record was made by P. Creechan for 29 May who claimed 'hundreds' along a woodland glade path on Bookham Common which leads to the Cobham Road. I first saw this claim on the Wild about Britain website. I had previously corresponded with him and I stated how surprised I was by this record and he sent me photographs which were certainly of this species, so even allowing for some possible over estimate of the numbers there were apparently large number of individuals present. Given that small numbers have been present on the Bookham streams for at least the last three years it is conceivable these could have been locally bred. It is certainly found on the River Mole in Surrey just outside our area. Hopefully 2013 will yield better weather to study this species at Bookham. Unfortunately, when I conducted a study day there in July the weather was poor and few Odonata were recorded.

The first downy emeralds *Cordulia aenea* were reported at Wake Valley Pond, Epping Forest on the 28 May by Phil Carter who found at least six individuals. The poor weather resulted in a protracted flight season with five still seen on 21 July when there was also a brown hawker present — the first time the observer had seen these two species on the wing together! Dr Alan Prowse also reported a downy emerald from Bookham on 30 May.

The only record of black darters *Sympetrum danae* was of four on 6 September from Esher Common which appears to be the only breeding location now in the recording area since the apparent extinction of the Wimbledon Common population.

Red-veined darters *Sympetrum fonscolombii* are largely a migrant species in the UK with some sites having temporary populations. There were some widespread records nationally in 2012 and some not too far away from our area at a site in Berkshire where the species has been recorded now for five years in some numbers with exuviae (proof of successful breeding) found. The LNHS area seemed to miss out this year on any immigration of this species with just one record of a male at Rainham Marshes on 20 September.

Perhaps the most exciting event was the addition of a new species to the LNHS recording area. Given the history of the last two years this wasn't a total surprise and on 4 September Jerry Hoare found and photographed a male southern migrant (also called blue-eyed) hawker *Aeshna affinis* at Rainham Marshes RSPB reserve on the dragonfly pool by the butts. The superb photos were posted on the reserve's website confirming the good find. On 8 September I was at the reserve looking for the popular Baillon's crake *Porzana pusilla* when Roy Woodward also spotted a male southern migrant hawker from the hide but it disappeared before I could see it. There were also large numbers of migrant hawkers *A. mixta* feeding on the reserve proving a popular meal for hobbies *Falco subbuteo* and a kestrel *F. tinunculus*. The reserve manager, Howard Vaughan, was of the opinion there were possibly several individuals of the rarity though this wasn't confirmed but certainly possible.

Prior to 2010 there were only six records of this species in Britain all of which were singletons. In 2010 at least twenty were found in Kent, Essex and Norfolk with the majority from the Thames Estuary. For the first time the species had bred in the UK with exuviae discovered in Hadleigh Country Park, Benfleet, Essex last year. This year there have been several sightings of this species in south Essex and north Kent with Wat Tyler Country Park recording up to six males from early August. Whether these are locally bred individuals or

fresh immigrants isn't known for sure but seems likely that at least some were locally bred. It is certainly a species to be looked out for in the coming years. Hopefully this will join our growing Odonata fauna (Figure 1).

The willow emerald damselfly *Lestes viridis* has yet to be found in our area but is now established in parts of East Anglia and has been found in both Essex and Kent this year, so surely not too long before this is discovered in the LNHS area?

One final rarity sighting but from outside our area was of a male lesser emperor *Anax parthenope* that I found on an LNHS coach trip to Dungeness over a pond near the visitor centre. This was seen well by many of the group and we had good comparisons with a male and female emperor *A. imperator* on the same pool. This was my first UK sighting though I've seen many further afield, so great excitement for the group.



FIGURE 1. Southern migrant hawker, *Aeshna affinis* at Hadleigh Country Park.

Photo: Sarah Barnes

2013

Winter 2012/13 extended well into spring with one of the coldest Marches on record so not surprisingly no April Odonata records were received this year. Predictably, large red damselfly was the first recorded species from three sites on 6 May and subsequently many other sites in the following days. There was a good count of over fifty from Victoria Park in early May.

The first hairy dragonfly was on 7 May at the London Wetland Centre — this site now appears to have a small resident population. A maximum of seven were recorded there on 4 June. Away from regular sites this species was also recorded at Thames Road Wetland, Crayford, Erith Marshes and a singleton at Northala Fields, Northolt.

A surprising record was of a newly emerged red-veined darter from Victoria Park boating lake on 1 June. Found by S. Haro, a founding member of the Finnish Dragonfly Society, his photos were forwarded to me. He had suspected the teneral was of a ruddy darter *Sympetrum sanguineum* but the pterostigma and the bluish underside to the eyes looked like red-veined darter to me and this was confirmed by Adrian Parr, the migrant recorder for the British Dragonfly Society. This was the first individual seen nationally this year and perhaps the first time it has been proved to have bred in the LNHS area, though it probably has done before during good migration years. There was also a good early emergence of common darters at this site in early June.

This red-veined darter record was unexpected as despite a good showing nationally in 2012 the only LNHS area record from this year was of a single male at Rainham late in the year.

Further sightings of this migrant species were of up to three males by the Round Pond, Kensington Gardens. The initial sighting was on 11 July by S. Fisher. He e-mailed me after his find to get confirmation of the identity. I visited on the 17 July and had good views of a single male basking on the path by the water. The final sighting was of two males on 21 July. I also recorded a pair of small red-eyed damselflies *in cop* at this site.

Brilliant emerald *Somatochlora metallica* seemed to have a reasonable season at its one station in our area at Black Pond, Esher Common with several males recorded. Four were first recorded on 18 June with two still present on 21 July. Downy emeralds were also seen here as well as at other regular sites to the east in Epping Forest. I also saw one on an LNHS field trip to Langham Pond, Runnymede. Esher Common was again the only site to record the heathland specialist black darter.

There was no update received this year on the scarce emerald damselflies that were discovered on a pond in Blackheath in 2012. Hopefully they will be checked for in 2014.

Only a single male beautiful demoiselle was reported from Bookham Common this year which is a big dip in records, which is probably a legacy of a dismal 2012.

Last year yielded our first local southern migrant hawker at Rainham Marshes but there were no follow-up records this year from this site though there were further records, mainly of males, from the more traditional sites just outside our area at Hadleigh Country Park, Wat Tyler Country Park and Cliffe Marshes. This is the fourth consecutive year with several records but the lack of female sightings puts a question mark as to whether this attractive species will become a resident part of our dragonfly fauna.

Surprisingly, 2013 yielded another new species recorded in the LNHS area — a vagrant emperor *Anax ephippiger*. This was discovered by Steve Murray at Hilfield Park Reservoir on 6 October. A description was forwarded to the national migrant recording committee by the Herts dragonfly recorder, Roy Woodward, and the individual was thought to be a sub-adult male. Vagrant emperors are mainly found in Africa, the Middle East and parts of south-east Asia. It has become much more regular along the Mediterranean in recent years (Parr 2011).

The first UK record was back in 1903 and the second over sixty years later in 1968. More recently the species has become much more regular with almost annual records. There was an unprecedented invasion commencing October 2010, a couple of January and February sightings in 2011 followed by a mini explosion of records through April into May. Some forty-five confirmed/

probable records were recorded in this influx though the true number of vagrants was likely to be much higher as many would have gone undetected.

Last year was a blank in the UK for the species but autumn 2013 yielded another influx of this nomad with many southern and western counties providing records. Most notable were two at Bovey Heath, Devon which were first recorded on 8 October and remained into November. Oviposition was recorded here — the second time this has been observed in the UK but the previous attempt wasn't successful.

It's probably unlikely the vagrant emperor will establish here but records are becoming more frequent and any winter dragonfly sighting may well be of this species following southerly winds.

Common darters were as usual the final species to be recorded in the autumn. Though no records were received beyond November here, in parts of Hampshire small numbers were recorded into December, with 11 December the final sighting in the New Forest.

Acknowledgements

As ever, thanks to all recorders who submit records to me. In addition to these and my own records, data were also obtained from a variety of websites such as the British Dragonfly Society, London Birders, *Atropos* and Rainham RSPB Reserve.

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Book review

The Helm guide to bird identification. An in-depth look at confusion species. Edition 2. Keith Vinicombe, Alan Harris and Laurel Tucker. Christopher Helm/Bloomsbury. 2014. 396 pp., colour illustrated. Card covers. £25. ISBN (print) 978 1 4081 3035 3, (e-book) 978 1 4729 0553 6.

Our islands receive displaced birds from a truly amazing variety of regions, from North America to, it seems, almost anywhere in Eurasia and occasionally from even further away. Although the field identification of many of these scarce forms has always been a challenge, today anyone with access to a rare-bird-alert system can manage to see such hitherto once-in-a-lifetime rarities almost any weekend. And if you can snap them with inexpensive modern camera gear, you can study the detail and confirm your identification at leisure. These days, it can be very easy indeed.

When a teenager I dreamed of seeing a Ross's gull: and, following just such an information line, one truly exciting day my wife and I did, a nice pink one, in Plymouth, along with several hundred other delighted birders. Most of us would have had a bird guide including rarities and how to separate them, and we all need such books for the occasional special day. The book under review adds to the growing number of reliable ones that so cater. Nominally an upgrade of the first edition (1989), it is nearly twice as long. Armed with such books even virtual novices can enjoy seeing the characteristics on which distinctions are made and can understand what the experts are saying, in a way that few pastimes can offer.

Since my teens in the 1950s field identification of birds has continued the great advances of the previous half-century and more. Among the most striking improvements has been the minute detail to which more knowledgeable birders now resort; and a perhaps surprising innovation has been the discovery of blindingly obvious field characters that were always there but previously overlooked. The latter has occurred in the UK in groups other than birds, from bats to barnacles and on plants too. I'll cite just one — primary projection as a means of distinguishing some warblers in the field:

simple, yet overlooked by even the most capable of ornithologists until just a few decades ago. Later in this review I'll mention a possibly new field character which you might try out but which I have not been able to find in the literature. But now back to the review.

The book has great merits and minor drawbacks. This second and much upgraded edition reflects changes in knowledge about, and the distributions of, British birds since the first appeared in 1989. It includes some forty additional species and innumerable newly defined subspecies. Geographically its scope is the UK, so Ireland is excluded (p. 10) though in practice the book will be useful across much of northern Europe. The book's faunal scope is less obvious. The species and subspecies included are those likely to prove confusing to some birders and which occur 'regularly' (p. 9) in the UK, or more frequently. 'Regularly' seems not to be defined, but under each form frequency and distribution are indicated in admirable detail.

But there is a paradox, that rarities appear alongside some common garden birds simply because all included might present an identification problem to one person or another. In addition, the rigid exclusion of species occurring just outside the UK might lead to problems. For example, the seemingly lazy crested lark, common around Calais, has at last been spotted a few times to have wandered across the English Channel to Kent; and the northward-spreading penduline tit is now recorded almost annually in southern England. Neither is included but in fairness these and others just extra-limital are well covered in several major modern field guides. In contrast, the plates differentiating the black crow species are beautiful and could be used as a school wall-poster (though inclusion of a perched hooded crow would have been desirable); and mistle/song thrush and the 'grey' pigeon species get similarly detailed treatment. Again, in the same book there is a magnificent plate showing certain plumages of the Turkestan shrike and forms with closely similar plumage states, in all, fourteen full-bird illustrations of shrikes that few beginners would see in the UK.

So who is the book for? It is certainly not a regular field guide. Some omissions seem unfortunate — for example, pied and related flycatchers; but if the species you are looking up is in this book, you'll find the text and illustrations superb. However, if you are a beginner, because of the book's exclusions it will be best used as an adjunct to a more-inclusive field guide rather than instead of one. Thus recently a keen-eyed entomologist friend asked me to identify a bird that was nesting in his garden. It was the great tit. Yet the yellow-bellied tit species are not in this book. Nor, for example, are woodpeckers and treecreeper. Short-toed treecreeper has now been recorded in England and, arguably, should be in.

All this is unfortunate, and belies the great contribution this book makes. The detail is staggering and helpful, and most of the plates are superb (many are new). If you are an experienced birder and need the latest information, or wish to enjoy the thrill of chasing rarities on a twitch, then buy it. The price is fair, and reproduction, text and illustrations are of the highest standard. Most of the time the existing guides by for example Svensson et al. (2009) and by Duivenduijk (2010) will more than suffice and can be used across Europe: but respectively, they lack the great detail, and lack plates. This slightly bulky book is certainly a 'must have' for any serious birder's library and for regular birders wishing to develop their skills with the superb detail that this book offers in the 'confusion' species covered, whether rare or commonplace.

Now, with the Editor's indulgence, to that new tip. On opening this book I looked first for slender-billed gull. The species is scarce but not rare in Lesvos, Greece, and I have seen a few there. Apparently, however, it is less-than-annual in the UK and I assume for this reason it does not get into the book. Many slender-bills are difficult to pick out within a perched flock of black-headed gulls since size can overlap and, for me anyway, they are often seen in poor light half a mile away and milling round in a mixed flock. Bill- and head-shape are not always prominent. But the following seemed to work in those I have seen. In perched slender-billeds viewed head- or tail-on the legs seem to be spaced apart by about two-thirds of the width of the body-plus-folded-wings, whereas in black-headeds the inter-leg distance is roughly half this parameter. This might not seem a great difference, but is actually easy to spot. So, this autumn, quickly scan your local flock of black-headed gulls and see what you can see. Maybe we can upgrade slender-billed to 'annual in UK'. And perhaps some other gulls can be so separated. You read it here first, folks!

I am most grateful to my birding friend Martin Smith for help in reviewing this book.

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PAUL CORNELIUS

Fungal plant pathology and Kew

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Abstract

In the nineteenth century mycologists would be considered plant pathologists as well as taxonomists and Kew was the centre of fungal expertise in Britain. Marshall Ward was sent to Ceylon (Sri Lanka) to look at coffee rust, on Kew's recommendation, and about a hundred mycologists were employed throughout the Empire. The devastation caused by plant diseases such as coffee rust and potato blight was known. In the twentieth century, as the discipline became more specialized, A. D. Cotton took Kew's plant pathology out of London to Harpenden, near Rothamsted. The Imperial Bureau of Mycology was set up on Kew Green, and led the field in abstracting and making available the vast literature on these topics as well as doing research, especially on microfungi which complemented the work of Kew. Commonwealth took over from Empire and with changing political organizations and technologies Kew mycologists concentrated on taxonomy. Many specialists including entomologists, bacteriologists, nematologists, virologists, epidemiologists, meteorologists, chemists, statisticians, modellers and even economists became involved in plant pathology. The twenty-first century faces new challenges and the Sainsbury Laboratory at Norwich has shown how modern methods include, as well as the gene analyser and sophisticated modelling systems, internet sites such as Github, the use of crowdsourcing genomic analyses, and the citizen scientist; the laboratory scientist reaches out to the public. Kew mycology still has an important role as a databank of collections, including the de Bary collection of microscope slides, in its fungarium and is currently doing DNA barcoding of fungal species. Kew also does some research on insect pests and the use of plants to combat them.

Introduction

This paper looks at the history of fungal plant pathology and Kew within a context of changing political structures. George Massee, the first full time mycologist employed by Kew, published a book on plant diseases for gardeners (Massee 1899). Since then plant pathology has not played a major role in Kew's mycology section because it has become such a diverse subject. Kew, as a centre of botanical expertise in the nineteenth century Empire, had a role in the spread of plants from one part of the world to another and in the staffing, including plant pathologists, of the Empire's botanical gardens and agricultural colleges.

Agriculture is fundamental to our way of life and there have been agricultural revolutions from the Neolithic age which have allowed populations to expand. In medieval times contaminated vegetables would be fed to pigs and their manure was spread on fields, but the spores could persist and spread contamination. The lifecycles of fungi were not yet understood, as also the relationship between different pathogens and their hosts. In the seventeenth and nineteenth centuries agricultural revolutions in Britain enabled the

expanding populations in factories and cities to be fed. At the same time there was a chemical revolution with an understanding of the need for minimum levels of certain nutrients, and artificial fertilizers and pesticides were created. Interactions needed to be studied as, for example, bacteria can denitrify the artificial nitrogen spread by the farmer and produce nitrous oxide and nitric oxide which damage the atmosphere. The nineteenth-century laboratory scientist's task was to understand the life cycles of crop and pest and possible chemical intervention in the form of artificial pesticides.

The discovery of the structure of DNA in the twentieth century led another revolution. The postwar scientists created the 'Green' revolution which enabled the developing countries to have hope. Always it was a race between the understanding of problems of production and disease within the whole ecological cycle. It was not just a relationship between plant and disease carrier; because as mankind became more and more urbanized the quantities of nutrients that disappear into the urban sphere and are then dispersed into rivers and oceans, and not back to the soil, will change the balance of nature. Phosphorus, for example, has a limited supply. We do not know the limits of interference in 'natural' cycles.

The impact of the potato blight in the mid nineteenth century caused mass migration and political unrest. It was non-governmental organizations like the Horticultural Society that spread information about plant diseases through their journal, started in 1845. In 1866 they received their Royal charter and the journal was edited by the Revd M. J. Berkeley, a mycologist famous for promoting the idea that the potato blight was caused by a fungus. However, it was 1907 before the RHS established a laboratory at Wisley. Previously, *Gardeners' Chronicle*, founded in 1841 and edited by John Lindley, an influential botanist, had also published on the potato blight which was one of the most devastating diseases of the time. The relationship between horticulture and agriculture was closer then and the Royal Agricultural Society, a non-governmental organization which looked at agricultural problems, employed de Bary, a German working in Strasburg, to look into the cause of the potato blight, and his methodology became fundamental to later plant pathology. In 1871 W. Carruthers, Keeper of Botany at the British Museum, became their first Consultant Botanist.

It was not until 1889 that the Government formed the Board of Agriculture. In 1903 an Act transferred to it certain powers and duties relating to the fishing industry. The President of the Board was renamed Minister of Agriculture and Fisheries in 1919. In 1954 the separate position of Minister of Food, created during the Second World War, was merged into the post and it was renamed Ministry of Agriculture, Fisheries and Food (MAFF). Then in 2001, Margaret Beckett became Secretary of State at the Department for Environment, Food and Rural Affairs (DEFRA) in another merger. The Department had charge of promotion, regulation, research, price support and subsidies, diseases and invasive species. The administrative and advisory roles were separate from the research roles. Kew gets Government funding through DEFRA for historical reasons; as noted in earlier days it had a role in sending plants and plant pathologists around the world as botanic gardens and agricultural colleges were set up throughout the Empire. Marshall Ward and E. J. Butler, later director of IBM, were two of these people.

The British Empire was based on trade and in 1869 the Suez Canal was opened which shortened the long voyage around Africa to the East. Trade

routes could also be routes for disease. Important crops like coffee, tea, rubber, chichona (for quinine), corn, and rice were spread from their native land to all corners of the world and Kew played its part. The movement of plants and animals around the world could bring new diseases (Large 1940). Diseases of plants affected crops but diseases such as influenza, smallpox and measles spread from animals; both could have a devastating effect on man. The political structures of the nineteenth and twentieth centuries saw great changes as Empire gave way to Commonwealth and the United Kingdom joined European organizations. The link between trade and botanical gardens became more tenuous.

Plant pathology

In the seventeenth century microscopic life was discovered by Hooke in Britain and van Leeuwenhoek in the Netherlands, using their new microscopes. They published their findings in the journal of the Royal Society which had only just been founded in 1660. They argued that life was not spontaneously generated but complex and it was the beginning of a truly scientific look at natural history. It is however, de Bary, in the nineteenth century, who is considered to be the founder of scientific plant pathology. He worked through systematically controlled experiments. De Bary's microscope slide collection is at Kew. Many British mycologists contacted him including Marshall Ward (Whetzel 1918). England did not produce a Pasteur or Koch but gradually the diagnosis of pathogenic agents and control treatments developed and it was realized that plant pathology needed bacteriologists and virologists as well as mycologists, entomologists, nematologists, chemists, statisticians, meteorologists and now even economists.

The organization of plant pathology took some time to develop (Ainsworth 1981). In 1890 at the International Congress of Agriculture and Forestry in Vienna an International Phytopathological Committee was formed. In the following year the Netherlands created its own organization followed, in 1908, by the American Phytopathological Society, which started publishing the scientific journal *Phytopathology* from 1911. In 1902 the first chair of Plant Pathology was established at Copenhagen and in 1907 the first academic department of Plant Pathology was established at Cornell University, which was to become an important centre of research. It was after the two World Wars, when in 1968 the first International Congress of Plant Pathology was held in London, that many countries created their own societies. The International Society of Plant Pathologists created the section Phytopathology of the Division of Botany of IUBS (International Union of Biological Sciences) which is the biological component of ICSU (International Council of Scientific Unions) funded by UNESCO. The British Society for Plant Pathology was only formed in 1981 and they now run popular Plant Doctor sessions at science festivals. [Website: <http://www.bspp.org.uk>]

War had shown that to rely on Germany was not always viable so in 1918 the Imperial Bureau of Mycology (IBM later to be IMI) was set up (Blight and Ibbotson 2010), five years after the Bureau of Entomology. With about a hundred mycologists working in the Empire it was deemed necessary to have a clearing house for world mycological intelligence, so a journal and abstracting service was created. The *Review of Applied Mycology*, published since 1922, supplied this need and under the director, E. J. Butler, Ainsworth compiled a bibliography of British plant diseases (Ainsworth 1937). After WWII the

Commonwealth was their focus but things were changing and with the setting up of the United Nations new organizations came into play. The Food and Agricultural Organization (FAO) was set up in 1945 in Canada, moving to Rome in 1951. This international organization has been controversial and accused of being too political. Setting up efficient multinational organizations to monitor and control disease has always been a problem.

As the understanding of plant pathology grew (Ingram and Robertson 1999) so did the biological understanding and concepts like the alternation of hosts in different parts of the life cycle of a rust, such as *Puccinia graminis* between wheat and barberry. Phytosanitation as quarantine, crop rotation, removal of alternative hosts and cleaning of seeds was practiced. Another was protection through fungicides. The concept of resistance became important too as cultivars were developed. Resilience and redundancy also help buffer against adverse conditions. Climate and abnormal conditions can stress the plant which becomes vulnerable to disease. The different roles of fungi were investigated and it was realized that mycorrhizas and endophytic fungi can be beneficial to plants while others can destroy them. E. M. Freeman, in the USA, had shown that the fungus in seeds of *Lolium*, ryegrass, helps the plant flourish (Ainsworth 1981). Work on mycorrhiza is an important part of the mycology section at Kew today. The interaction of plants and insects was another area of research, and fungi can be useful to destroy insect pests.

Alongside the understanding of plant lifecycles and metabolism the chemical industry produced insecticides, fungicides, etc. The publication of *Silent Spring* (Carson 1962) about the impact of pesticides on wildlife began the debate on the technological control of nature. In 1967 plant pathogenic mycoplasma-like organisms (MLOs) were recognized in Japan. The diversity of life continues to surprise us. Most of the population now lives in an urban context, divorced from the immediacy of growing food and unaware of the devastation caused by major plant diseases.

Kew and beyond

The first Director of Kew, William Hooker, had encouraged the Revd M. J. Berkeley to study fungi and he had found the cause of the potato blight to be fungal. Joseph Hooker, his son and second Director, was aware of the importance of plant pathology and had advised on sending plant pathologists to the outposts of Empire such as Marshall Ward sent in 1879, on Kew's recommendation, to Ceylon (Sri Lanka) to look into coffee rust. There he also went on to be interested in bacteriology and visited de Bary on his return. Ward became Professor of Botany at Cambridge, succeeding Balfour in 1895. Cambridge is still a centre of epidemiology. Hooker appointed the first mycologist at Kew, M. C. Cooke, who was valued as a plant pathologist but only worked there three days a week. Cooke was followed by G. E. Massee, whose text book on fungal diseases for gardeners went into several editions (Massee 1899, 1907). E. S. Salmon (1871–1959) worked on the Erysiphaceae in the Jodrell Laboratory at Kew, particularly on diseases of the hop, and published with Massee. Massee's son was to become an entomologist at the East Malling research centre; one of the many research centres at that time.

The twentieth century saw the development of plant pathology into the complex system it is today. It was A. D. Cotton, employed under Massee from 1904 to 1915, who developed plant pathology at Kew. The 1909 Development Fund Act made money available for plant pathology and a section was set up at

17 Kew Green. In 1918 the Board of Agriculture moved it to Harpenden, under Cotton. He was the first mycologist on the Board. He retired in 1922 and returned to Kew as Keeper of the Herbarium and Library until 1946. However, in 1929 he established the British Mycological Society's Plant Pathology Committee, serving as its secretary. Harpenden continued to look at destructive pests and insects as well as fungi and part went to Rothamsted and part was incorporated into the Government's Central Science Laboratory that moved to Sand Hutton in Yorkshire in 1996.

Also at Harpenden is the Rothamsted Research Centre, originally founded in 1843 by John Bennet Lawes who had experimented with fertilizers and plant nutrients at Deptford and Barking Creek. It is one of the oldest agriculture research centres in the world. Mainly dealing with crop plants they employ mycologists, entomologists and many other disciplines.

At Kew, Massee was followed by Elsie Wakefield, the first academically trained mycologist employed by Kew, who trained mycologists to be sent to the tropics. In 1922 the Imperial College of Tropical Agriculture was set up in Trinidad and Tobago which became a centre of expertise. The Imperial Bureau of Mycology (IBM) as noted above, with the complementary Imperial Bureau of Entomology, meant that Kew could follow a more strictly taxonomic role. IBM, later International Mycological Institute (IMI), became the largest centre for systematic mycology in the world. However, as the old colonies got their independence they wanted their own research centres. In 2009 the IMI collections came to RBG Kew which became the largest collection in the world, now known as a fungarium.

Ainsworth (1981) points out that the farmer is reluctant to pay for plant pathology and most research is government led. The government has to pass useful legislation and to see research is undertaken. Legislation is usually in response to problems. In 1981 the Wildlife and Countryside Act covered some aspects of plant health, and in 2005 the government published the Plant Health Strategy for England. Pest risk assessment (PRA) should be carried out and Integrated Pest Management means that more than mycology is necessary. Protocols have been published (Lane et al. 2012) for some fungal plant pathogens and care should be taken when studying these as contamination is always a problem. Techniques have become more specialized, such as ELISA (enzyme-linked immunosorbent assays) developed for virus, poly and monoclonal antibodies, and PCR (polymerase chain reaction) is commonly used.

CBOL (Consortium for Barcoding-of-Life) is one of the latest organizations that are attempting to structure the knowledge of identifying plants and their pathogens. Kew is currently working on a joint project with FERA to develop methods to DNA barcode plant pathogens, using its collections. These form an important databank that can be used by researchers. The focus is on the keeping of types and voucher specimens, including those used in DNA barcoding. Recently, using herbarium material, it has been found that the modern potato blight is different from that in the mid nineteenth century. There is always a dynamic of science and politics in our understanding. Plant pathology might be seen as a negative side of mycology but fungi have lessons to teach us such as the importance of symbiotic relationships and recycling (Stamets 2005).

The diversity of people necessary for effective plant pathology is also reflected in the diversity of techniques. The recent outbreak of ash dieback

disease, caused by *Chalara*, was responded to by The Sainsbury Laboratory at the John Innes Centre using modern technology in gene analysis and social networking — such as Github for software development and open-source projects such as the use of gamers to match DNA strands. Professor Sophien Kamoun gave a talk to the Linnean Society in 2013 which led to a lot of interest and questions about changing methods for changing times. It would appear that the species is very polymorphic but whether this is typical of fast spreading diseases is not known.

How do we conserve the diversity of nature? Plant diseases act to change the balance of species and this can drive evolution. It is recognized that everything is related and nature does not stay in one place, but creating organizations to deal with a fast-changing world and the huge amount of information is a major problem. Reservations can hold a sample of species as the world around them changes, restoration can be used to bring damaged land back to a more stable ecosystem, and reconciliation ecology is another new concept. An oceanographer, one of the authors shortlisted for the 2013 Royal Society's Science Book Prize (Roberts 2013), states that we passed our ecological footprint in 1979 and now all our systems are under pressure; but the fact that the Index of Well Being (published by The Office of National Statistics) has gone up makes it difficult to get the urgency of the problem across. The shifting baseline between generations also means that each generation only sees a smaller increment of what is turning into a major change. Mycology and plant pathology at Kew have seen many changes in the generations of the last two centuries and there will probably be more in the future.

Acknowledgements

I would like to thank the staff of the libraries and archives at the Royal Botanic Gardens, Kew, the Zoological Society of London, and the Wellcome Trust; also Dr Bryn Dentinger, Professor Monique Simmonds, Marcia Tolfts, Dr Paul Kirk and Mary Gregory at Kew for information and advice. I also thank Keith Hyatt, who is now standing down as editor of *The London Naturalist*, for his ever-helpful advice.

Note. I would like to thank Professor Dianne Edwards for bringing to my attention the fact that Sir David Read is an FRS (1990) and that he stepped down as Biological Secretary of the Royal Society in 2008. Sir David Read is well known for his work on mycorrhiza. I had made an internet search under 'mycologist' and checked with the archivist. A. H. R. Buller, who died in 1944, is the last mycologist that comes up. This error arose partly from reliance on the internet and partly due to the compartmentalization of knowledge.

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Timeline

Some important events in the history of plant pathology, not all of which are covered in this paper.

1665 Hooke's illustration of plant microfungus (rose rust).

1802 Lime sulphur introduced by Forsyth.

1807 Prévost's experimental proof of fungal pathogenicity for plants.

1843 Rothamsted founded at Harpenden, Hertfordshire.

1845–9 Potato blight in Ireland.

1858 *Die Krankheiten der Kulturgewächse* by Julius Kühn (a father of plant pathology).

1865–6 de Bary demonstrates heteroecism of *Puccinia graminis*.

1868–82 Coffee rust in Sri Lanka devastated crop but planters learnt to call in the pathologists when cocoa was attacked.

1878–85 Vine downy mildew in France.

1885 Bordeaux mixture, copper replaces sulphur; Millardet.

1890 International Congress of Agriculture and Forestry, Vienna: International Phytopathological Committee set up.

1891 Nederlandsche Phytopatologische Vereeniging founded.

1902 First chair in plant pathology at Copenhagen.

1907 Cornell University, New York, first department of plant pathology.

1908 Destructive insects and pests Act (many revisions follow).

1908 American Phytopathological Society (APS) founded.

1911 *Phytopathology* published by APS.

1913 Imperial Bureau of Entomology set up.

1913 Organic fungicides introduced.

1914–18 **WWI**

1914 Institute of Plant Pathology at Kew, 1918 relocates to Harpenden.

1914 Association of Applied Biologists publish *Annals of Applied Biology*.

1917 Danes had eliminated barberry (host of the alternate generation of *Puccinia graminis*, rust of wheat)

1920 Imperial (later Commonwealth) Mycological Bureau (later Institute) founded at Kew. E. J. Butler director.

1920–70 Dutch elm disease (*Ceratocystis ulmi*) leads to great change in the British countryside.

1922 *Review of Applied Mycology* (from 1970 *Review of Plant Pathology*) published by IMB (later CABI).

1922 Imperial College of Tropical Agriculture set up in Trinidad and Tobago.

1929 International Convention for the Protection of Plants.

1933 Pharmacy and Poisons Act.

1939–45 **WWII**

1945 FAO (Food and Agriculture Organization) founded by UN (United Nations).

1950 WMO (World Meteorological Organization) founded; originated from International MO, founded in 1873.

1951 European and Mediterranean Plant Protection Organization (EPPO). FAO International Plant Protection Convention (IPPC). Rivers (Prevention of Pollution) Act (updated 1961).

1962 *Silent Spring* by Rachel Carson published.

1967 Plant pathogenic mycoplasma-like organisms (MLOs) recognized in Japan. John Innes Centre, founded 1910, moves to Norwich. Plant Health Act repeals previous three. 'Insect' includes bacteria and other vegetable and animal organisms.

1969 First International Congress for Plant Pathology in London.

1972 Deposit of Poisonous Waste Act.

1974 Control of Pollution Act.

1979 The Plant Pathology Laboratory is renamed Harpenden Laboratory.

1981 British Plant Pathologists Society founded. Wildlife and Countryside Act.

1986 Control of Pesticides Regulations.

1988 IPCC (Intergovernmental Panel on Climate Change) established by UN.

1990 Central Science Laboratory incorporates Harpenden Laboratory; 1996 relocates to Sand Hutton, Yorkshire. Integrated Pest Management.

2004 Stockholm Convention on Persistent Organic Pollutants comes into force. Signed 2001.

2005 Plant Health Strategy for England.

2007 4th Report of IPCC shows the rate of global warming is increasing.

2012 Ash dieback disease first seen in England.

2013 The Sainsbury Laboratory uses social media as well as scientific expertise in tackling ash dieback.

Survey of Bookham Common

SEVENTY-SECOND YEAR

Progress Report for 2013

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Introduction (Stuart Cole, Chairman)

As will be evident from the following, Bookham Common continues to provide a refuge for a rich variety of wildlife despite the pressure from public use. It is particularly pleasing that nightingales are thriving at Bookham despite national decline and dormice are still present in the woodland. However there is concern that pressure is increasing and may be having a detrimental effect (see Alan Prowse's comment below). Human activity will grow with the planned housing development at the Grange Hotel site immediately adjacent to Bookham Common. This makes the likely loss of a resident ranger, a position currently occupied by Ian Swinney, in 2017 all the more worrying.

We had two field study days in July and August led by Neil Anderson and Sarah Barnes respectively and I am grateful to them for their continued involvement at Bookham.

Mammals (Alison Fure)

The usual mammal and bird species had occupied the mammal boxes. One dormouse nest was found in a box situated just off the Glade Path. The tit and wood mouse (Figure 1) occupancy of boxes was almost the same as in 2012 although the box locations were different: eighteen nests of the former and fourteen winter nests of the latter. Thankfully there was no weasel predation of the box occupants this year. Signs of badger activity (foraging and latrines) were found in the usual hotspots in One Hundred Pound Wood.

Birds (Alan D. Prowse)

Hawfinches were recorded as singles only on seven occasions between 1 January and 8 February. A goosander was seen flying over on 3 January. A jack snipe was flushed on 16 March. A male common redstart was recorded on the Surrey Bird Club (SBC) site from 15 April until at least 18 April. This species occurs infrequently at Bookham. On 31 May a grasshopper warbler was heard and seen on Western Plain near Nightingale Corner by Mike and Jane Clifford (SBC). There were three lesser whitethroat territories, two on Central, and one on Isle of Wight Plains. Red kites (Figure 2) are seen flying over from time to time as they become commoner in Surrey, but a date of 6 November was unusual.



FIGURE 1. Wood mouse in dormouse nest box.

Photo: Alison Fure

FIGURE 2. Red kite near Merritt's Cottage

Photo: Stuart Cole

On 18 May, during the LNHS walk with Pete Lambert, Ruth Iredale and Alan Prowse, a phylloscopine warbler was singing near the railway station, with a mixed chiffchaff/willow warbler song, though predominately the latter. RI had first heard the song in April. Jizz indicated the bird was a willow warbler, and photographs showed the bird to be that species, on bill, colour of legs and feet, superciliary, eye crescents, ear coverts, and primary projection.

The heronry had eleven nests this year. Its position has contracted to a few trees not far from the Isle of Wight Pond. The main part of the heronry of 2011 and previous years is no more. As the only Surrey heronry on land with public access, the pressure from the numbers of dog walkers from dawn to dusk is perhaps telling.

The wood ducks *Aix sponsa* have continued to occur from time to time on the pond system. The male appears to be a normal specimen, but at least two females have been photographed, both of which are leucistic, one much more than the other, though the three birds have not been seen together. The Isle of Wight Pond island now has some vegetation and was used by a pair of Canada geese. The rest of the pond system has improved with the management changes and a tufted duck pair was present again this year though no young were seen.

Nightingale surveys

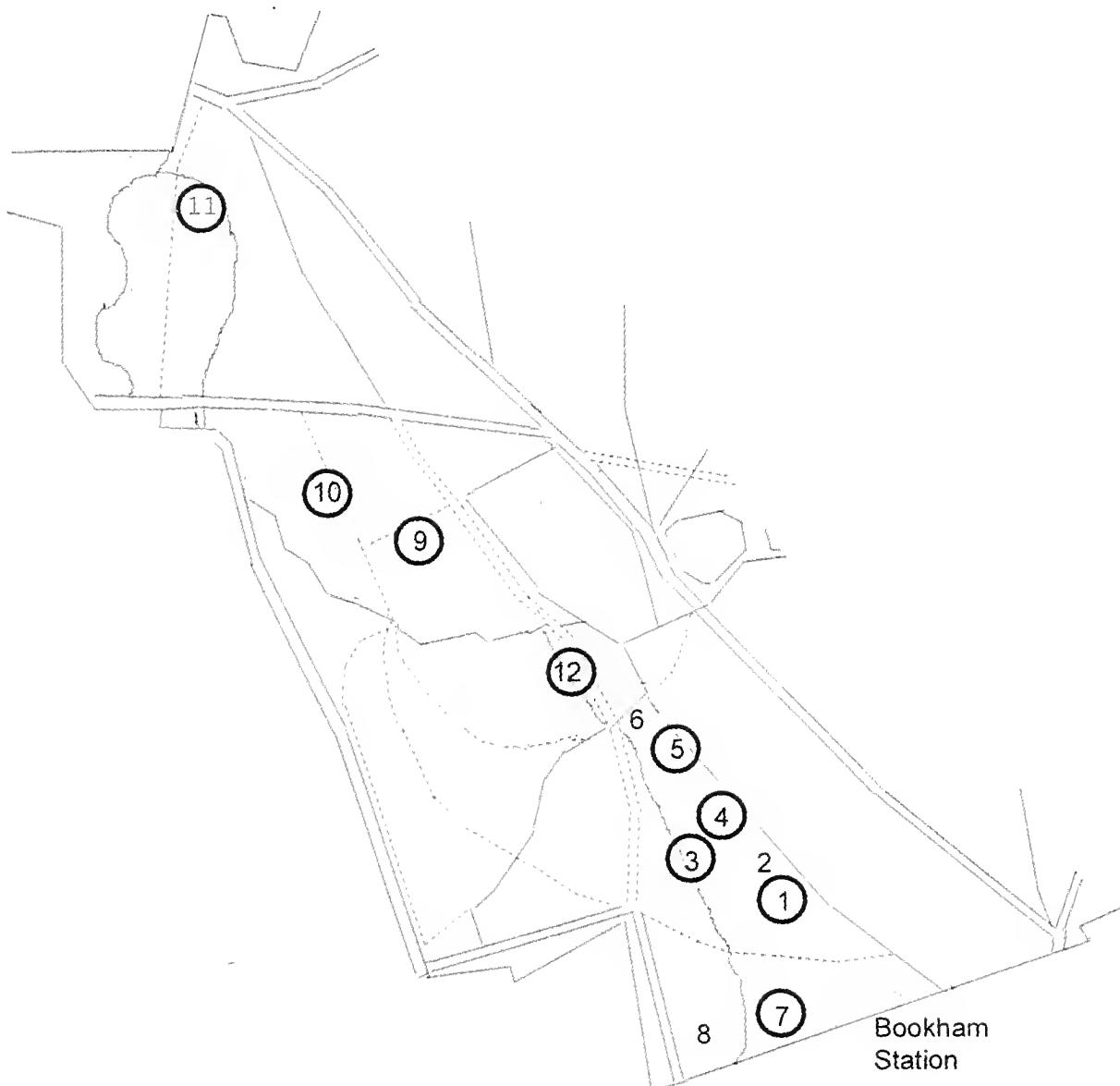


FIGURE 3. The distribution of nightingale territories on the plains of Bookham Common, 2013. The numbers are circled on established territories.

Nightingales were surveyed nationally by the BTO in 2012, with a repeat in 2013. The previous BTO survey of the species, in 1999, found twelve territories, itself a record for the Common. In 2012 and 2013 Ruth Iredale surveyed the Common. Seventeen territories were recorded in 2012, by far the largest total ever on the Common, despite the 57 per cent decrease in the species nationally since 1995. In 2013 there were nine territories recorded, with three other places where apparent migrants called. It is extremely difficult to be certain of the status of some of these at times. Figure 3 shows the distribution of the records on the plains in 2013. Territory 7 is of interest. Singing was recorded here on the 4, 5 and 7 May (RI). There were no further records in the following few weeks despite the area being covered regularly; on 13 June ADP heard nightingale alarm calls at this site directed at a jay in a nearby tree. Both parents were there with at least three young calling in the undergrowth. It has occurred before on the Common that a nightingale stops singing when paired, and this makes surveys difficult. Against this background it is possible that records of birds at 2 and 5 on the map represent other territories, but it is thought unlikely; bird 8 was definitely a migrant calling on one occasion only on 4 May. The conservation methods used on the Common are therefore of importance. They were discussed in Prowse (1999) and recently discussed in more detail when advising the Ashtead Common Group about attracting nightingales back to that site.

The BTO has published its Bird Atlas for survey work done tetrad by tetrad from 2007 to 2011, throughout the year. Ruth Iredale and Anna Stribley covered the tetrads of Bookham Common and the surrounding area and we are grateful to both of them. Ruth Iredale has surveyed the nightingales of the Common in the past two seasons. In 2014, she has begun further surveys on the Common. It is good to have surveys of the birds starting again.

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Plant galls (Tommy Root)

This is my second year looking at the galls of Bookham Common. I have been conducting one survey a month from June to October by targeting sectors as defined within an LNHS site map. I have surveyed all sectors within the common. As galls tend to be more numerous on the edge of woodland rather than the interior, I tend to survey sticking to the designated paths.

The species count for Bookham, from the two years of surveys, is now sixty-eight species with numbers among inducing groups as follows:

20 mite	2 sawfly
3 Hemiptera	9 fungal
14 Diptera	2 others
18 wasp (all on oak)	

One fungal gall, *Bauhinus cordae* on water pepper (Figure 4), was the only example of the species that I have found anywhere. It affected the flowers which were coated in dark powdery spores.

For 2014, I intend to do more targeting of individual host species, for example oaks in June for sexual phase wasp galls. The vast majority of oak-associated gall wasps utilize a cyclical parthenogenetic life cycle. Some will utilize



FIGURE 4. *Bauhinus cordae* on water pepper.
Photo: Tommy Root



FIGURE 5. *Andricus grossulariae* (asexual phase), a wasp-induced gall on *Quercus robur*. The sexual phase gall is found on *Quercus cerris* catkins as discrete round bobbles.

Photo: Tommy Root



FIGURE 6. *Acalitus brevitarsus* on alder — a mite gall with erinea hairs. Mite-induced galls can also be found in the form of leaf pustules, leaf nails or distorted growth.
Photo: Tommy Root

introduced Turkey oak *Quercus cerris* for the sexual phase of its development (early season), with asexual phase galls found on *Q. robur/petraea* (late season).

There are some *Quercus cerris* trees on site and I shall target these with the express purpose of finding species that use *Q. cerris* early season. *Andricus grossulariae* (Figure 5), *A. lignicolus*, *A. lucidus* and *A. quercuscalicis* have all been found on site as late season asexual galls on *Q. robur*, therefore sexual phase galls on *Q. cerris* may also be present. Figure 6 shows galls of *Acalitus brevitarsus* on alder.

Many of these species have appeared since the 1990s and it has been speculated that increased travel to Europe (perhaps via the Channel Tunnel) may have resulted in these introductions.

Invertebrate Field Study Day, 13 July 2013 (Neil Anderson)

Following recent years with wet and cool study days, 2013 yielded a hot and sunny day with a high of 31°C. A good crowd of about twenty people attended.

Meadow browns were the most numerous species of butterfly with over forty seen. This species had showed a decline last year so it was good to see more this year. Gatekeepers had yet to emerge and other satyrines encountered were about fifteen ringlets, a single speckled wood and again a wandering marbled white, a species which now gets recorded in most years at Bookham.

The only whites seen were a couple of large whites. Small tortoiseshells have shown a steep decline over the last decade or so but seemed to show something of a resurgence in 2013. We saw two at Bookham as well as five commas. Other nymphalids recorded were about ten white admirals and fifteen or so silver-washed fritillaries, both target species here. Given the perfect weather conditions it was something of a shock to see no purple emperors at the traditional master tree area despite spending an hour there after lunch. We met another naturalist who had photographed a male purple emperor on the ground near the Tunnel Car Park earlier in the day, so the species was present. Some places in the country were reporting record numbers of this species, even making the letters page of some broadsheets. Could it have been too hot for them to lek on this day?

Lycaenids were represented by singletons of both holly blue and purple hairstreak. The latter I encountered in lower numbers than usual at all the sites I regularly visit where this species occurs — probably a result of the dire 2012 weather.

More Odonata were seen this year at the Isle of Wight Pond. Species recorded included four emperors patrolling, regular skirmishes between five male black-tailed skimmers, two broad-bodied chasers and a brown hawker. Over a hundred common blue damselflies were seen over the water with fewer azure damselflies around the margins. Two male banded demoiselles and a single emerald damselfly made up the rest of the tally here.

Normally the wetland flora at the eastern side of the Isle of Wight Pond is productive for insects. This is the first year since I have been leading these walks that we have failed to find the attractive beetles *Chrysolina herbacea* and *C. polita*. We did find a boxbug *Gonocerus acuteangulatus* amongst some *Juncus*. This coreid bug has shown a great expansion in range in recent years as well as exploiting a wider range of plants than the traditional box which it fed on at its once only UK location at nearby Box Hill.

Two carabids recorded were *Pterostichus niger* under a log and the smaller *Bembidion illigeri*. A single larva of a 14-spot ladybird was found by sweeping.

Following a very cold spring the development of orthopterans was behind the normal schedule with many individuals present still as nymphs including long-winged conehead and speckled bush-cricket.

Other than insects a pair of buzzards, now a regular sighting at Bookham, and four great crested newts under a rock were highlights for the group.

As a follow up, my partner Kathryn Bull and I visited again on 31 August to look for brown hairstreak, a species which has colonized here in the last decade or so. Within a ten-minute walk of the station we located our first individual, a female, fluttering low around a small blackthorn on Central Plain. We watched her climb down to lay an egg and after five minutes or so she rapidly flew off. We later encountered two more females.

Other species found but not seen on the study day, were red admiral, green-veined and small whites, common blue, a brown argus intent on ovipositing opposite Merritt's Cottage, and a small copper.

Dragonflies recorded included thirteen migrant hawkers, a southern hawker, over forty common darters and six ruddy darters. Whilst looking for Odonata we watched a grass snake about 1.5 metres long swimming across the Isle of Wight Pond.

Also of note was a single rufous grasshopper opposite Merritt's Cottage — a productive spot!

Grasshopper and bush-cricket Field Study Day, 10 August 2013 (Sarah Barnes)

A number of members and friends attended the 2013 grasshopper and bush-cricket Field Study Day. The weather was overcast and the Orthoptera were a little quiet.

After handing out the catching jars, allowing people to catch and study what they had found, we made our way slowly onto the Common. We checked brambles and other plants for dark bush-cricket *Pholidoptera griseoaptera* and speckled bush-crickets *Leptophyes punctatissima*.

In the long grass we were soon chasing Roesel's bush-cricket *Metrioptera roeselii* and long-winged conehead *Conocephalus discolor*, and becoming familiar with the yellow U around the edge of the pronotum on the Roesel's, and the distinctive long wings and slightly curved ovipositor on the female of the long-winged conehead. These features easily distinguish it from the short-winged conehead *Conocephalus dorsalis*.

We spent some time searching for rufous grasshopper *Gomphocerus rufus* but could not find it on the overgrown Western Plain. However, I received records from both Bill Dykes and Neil Anderson that they had found the species on their separate trips to Bookham after the Bookham Field Study Day, so the species is still there. It is normally a chalk species and so this small colony on the Western Plain is unusual.

While we were on the Western Plain we found meadow grasshopper *Chorthippus parallelus* and field grasshopper *Chorthippus brunneus* and learnt the difference between bush-crickets and grasshoppers and then the finer differences between these two species. We then found common green grasshopper *Omocestus viridulus* and got to grips with identifying that.

After lunch we took a walk around the Isle of Wight Pond area and with much beating of the trees found some oak bush-crickets *Meconema thalassinum*.

We continued slowly around the Isle of Wight Pond and then back to the station, encountering more of the species we had already seen and, as the temperature increased slightly, we started to try and learn the individual calls of the bush-crickets and grasshoppers which are as distinctive as bird song when you listen carefully.

Thank you to everyone who attended, helped to find the different species and showed such enthusiasm for this group of insects.

Additional field notes (Stuart Cole)

9 March. On this month's survey day we were accompanied by Duncan Sivell from the Natural History Museum and he found and identified the following millipedes, centipedes and woodlice:

DIPLOPODA — millipedes

Julidae	<i>Tachypodiulus niger</i>
	<i>Cylindroiulus punctatus</i>
Blaniulidae	<i>Proteroiulus fuscus</i>
Polydesmidae	<i>Polydesmus coriaceus</i>

CHILOPODA — centipedes

Lithobiidae	<i>Lithobius variegatus</i>
	<i>Lithobius forficatus</i>
	<i>Lithobius muticus</i>
	<i>Lithobius crassipes</i>
	<i>Lithobius microps</i>
Geophilidae	<i>Geophilus easoni</i>
	<i>Geophilus flavus</i>
Schendylidae	<i>Schendyla nemorensis</i>
Cryptopidae	<i>Cryptops hortensis</i>

CRUSTACEA — ISOPODA — woodlice

Oniscidae	<i>Oniscus asellus</i>
Philosciidae	<i>Philoscia muscorum</i>
Porcellionidae	<i>Porcellio scaber</i>
Trichoniscidae	<i>Trichoniscus pusillus</i> agg.

11 May. A day of sunshine and rain. A cuckoo was heard on the plains and a couple of nightingales singing at woodland verges; also the alarm call of a bullfinch.

Bookham Common is bounded on the north-west by Great Mornshill Wood which is privately owned and just outside the recording area. However, there is public access in the part adjacent to Bookham Common and we explored this area today. It is mostly oak, birch, hazel and sycamore, some cleared and thinned. There were fine swathes of bluebells, interspersed with patches of wood sorrel *Oxalis acetosella*, wood anemone *Anemone nemerosa* and bugle *Ajuga reptans*, with other less-abundant woodland flowers including primrose and wood forget-me-not *Myosotis sylvatica*. We were unsure whether *M. sylvatica* is present here as a native or as the escaped garden form.



FIGURE 7. *Diaperis boleti* (Tenebrionidae) on birch bracket fungus, $\times 7$. Photo: Stuart Cole



FIGURE 8. *Apoderus coryli* (Attelabidae) on hazel, $\times 10$.

Photo: Stuart Cole

The formerly rare tenebrionid beetle *Diaperis boleti* (Figure 7) was found in birch bracket fungi. Clumps of figwort *Scrophularia* were supporting three species of *Cionus* weevils: *C. alauda*, *hortulanus* and *tuberculatus* as well as *Cleopus pulchellus* which was formerly included in *Cionus*. The small jumping weevil *Tachyerges salicis* was beaten from sallow and one of the distinctive red weevil *Apoderus coryli* (Figure 8) cutting a leaf of hazel. Back at Merritt's Cottage the handsome ground beetle *Carabus nemoralis* (Figure 9) was found wandering across the lawn.

Later in the month Alan Prowse found the scarce hoverfly *Xanthogramma citrofasciatum* on Bayfield Plain.



FIGURE 9. *Carabus nemoralis*, $\times 3$.

Photo: Stuart Cole

8 June. A fine day, sunny but with a cool NE wind. In woodland several of the red and black leafbeetle *Gonioctena viminalis* (Figure 10) were present on sallow foliage, a number of the black weevil *Deporaus betulae* (Figure 11) were cutting leaves on hazel prior to rolling them into a tube for the larvae to be left suspended to the midrib by a sliver. A number of the attractive longhorned micro moth *Nemophora degeerella* were in flight along a woodland path. Mick Massie found several of the small longhorn beetle *Poecilum alni* and one of the jewel beetle *Agrilus viridis* on a oak log pile outside Merritt's.



FIGURE 10. *Gonioctena viminalis* on sallow, $\times 6$.

Photo: Stuart Cole



FIGURE 11. *Deporaus betulae* on birch, $\times 8$.

Photo: Stuart Cole

19 June. I returned to the Common on a warm muggy day and came upon several *Poecilum* scurrying round like ants on the same oak logs. Wasp beetles *Clytus arietis* too were frequent. Other insects noted were a dusky cockroach *Ectobius lapponicus* and a couple of the large red and black froghopper *Cercopis vulnerata* on a dock leaf.

10 August. A sap run on the trunk of a mature oak tree by the railway station was attracting a host of calliphorid and muscid flies, a couple of hornets, a speckled wood, a white admiral and the nitidulid beetle *Cryptarcha imperialis*. Mick Massie found the NB bee *Hoplitis claviventris* on fleabane flowers. A little egret was spotted flying over the plains.

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Book review

A comprehensive guide to insects of Britain & Ireland. Paul D. Brock. 2014. Pisces Publications. 524 pp. Limpback, £27.50. ISBN 978 1 874357 58 2.

For several years the best all-round insect identification books for the UK were any of the several written by Michael Chinery. They all had a similar selection of species and covered those of both the British Isles and certain portions of Europe. His *Insects of Britain and Western Europe* came with me on most field trips over the last five years but, while much loved, I had various issues with some of the illustrations and the choices of species represented in certain groups.

So I was quite excited to hear that Paul Brock (with the aid of several national experts) was working on a new British guide in the same format as his earlier excellent guide to the insects of the New Forest.

This new guide is a little too big for the pocket at 524 pages but makes excellent use of the space and the narrowed scope (strictly insects and only of Britain and Ireland) to better cover each family or order of insect. Within each two-page spread Brock's managed to cram in descriptions for each species including information on identification, habitat, seasonality and abundance; as well as well-chosen, illustrative photographs and distribution maps for nearly all species described.

For the particularly photogenic or distinctive species groups, coverage is about as comprehensive as possible — all the butterflies, shieldbugs, grasshoppers, crickets, bumblebees, larger ladybirds, dragonflies and damselflies are covered; as well as most of the macro-moths. In particularly speciose or difficult families, common or distinctive species are shown and the total number of species for that family is given — it's also good to see that care has been made to let you know which species you can identify just using this guide and which will need more specialist literature. It may not be 'comprehensive' as the book title suggests (with 24,000+ UK insect species to choose from that's hardly surprising!) but it covers over 2,100 species compared to about 1,500 in Chinery's books making it the 'most comprehensive'.

I've had a lot of success with this book this past summer and it's definitely replaced my pocket-worn copy of Chinery which now enjoys a well-earned retirement on the bookshelf.

ROBERT WALLACE

Obituary

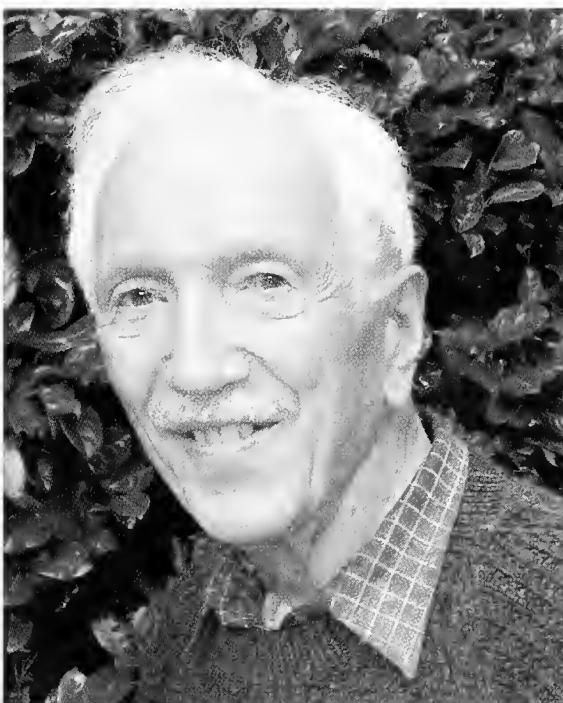


Photo: K. F. Betton

PHILIP ARTHUR DOMINIC HOLLOW, 1912–2014

Born on 9 June 2012 in Bickley, Kent, Phil Hollom (affectionately known as PADH by some) was to become a birding hero of many amateur ornithologists. He authored and co-authored several of the key books that helped birdwatchers from the 1950s onwards to improve their field skills. He reached the great age of 102 before his death on 20 June 2014. He had been a member of the LNHS since 1929.

Phil's first memory of birds was of being lifted up at the age of four to peer into the nest of a song thrush. The memory was as clear to him nearly a hundred years on as it was then, and he told friends how clearly he could still recall the beautiful mud-lined nest and the bright blue of the eggs that it contained. As a boy he was fascinated by birds and used to catch them using a garden sieve held up by a twig and a piece of string. In the 1920s it was the only way that he was able to handle birds.

From the age of ten to fourteen he attended Heddon Court School in Cockfosters. The headmaster recognized his interest in birds and allowed Phil to wander around the agricultural land away from the school fields. He was the only boy allowed to do this. In 1926 he moved to King's School in Bruton, Somerset. There were many nesting birds nearby so Phil decided to carry out an intensive study in an area of four square miles.

By 1928, Phil had discovered in his village of Addlestone a fellow teenage bird enthusiast called Tom Harrisson. Harry Witherby was the man in charge of the national bird-ringing scheme at the time and he provided metal rings which would allow the birds to be traced if found. Phil and Tom were regular visitors to Harry's house by Gracious Pond on Chobham Common, where they were taught the finer details of bird study.

In the summer of 1929 Phil ringed more than 250 swallows! He continued his studies of these birds in Bruton well into his early nineties — making an annual trip from Surrey in order to do so. On leaving school at seventeen, Phil got a job, but continued his bird studies, being guided by Harry Witherby and Max Nicholson, and in 1931, at just nineteen years of age, he jointly organized a national survey of the great crested grebe with Tom. Phil wrote up his findings

for the London Area in a paper for the 1932 *London Naturalist*, as this was at a time when many new gravel pits were being excavated around west London and none of these were shown on the available maps. Eager not to miss any potential grebe habitat Phil persuaded Marquis Masa U. Hachisuka to fly him over these areas of water in his private plane. Not only was he a member of the Japanese Royal Family, he was also a keen birder. Phil moved in good circles!

From 1931 to 1934 Phil regularly visited Brooklands Sewage Farm, and although the birding potential was rather average he was rewarded for his efforts by finding an avocet which was present from 13–16 June 1932. The London-based 1937 Bird Club was founded and Phil soon joined and found himself dining on a regular basis with several others who were to shape the face of British ornithology over the next half-century.

In 1940 Phil joined the Royal Air Force and travelled to Pensacola in Florida to learn how to fly. He spent eight months there and often used to see flocks of birds when he was in the cockpit. From 1942 to 1946 he was based in various places around the country, and was honoured to be flying VIPs on special visits. These included the Archbishop of York and the Anglo-American Committee on Palestine, and he spent six weeks transporting them around the Middle East and Europe in a Dakota. It was these visits that made him realize that there was no book to help people to identify birds in Europe.

In 1947 he joined the LNHS Ornithological Records Committee at the age of thirty-five, remaining involved until 1971. He also sat on the Surrey Bird Club Records Committee from 1957 to 2000. In 1952 Phil published his first book, *The Popular Handbook of British Birds*. However, he was frustrated that there was still no European field guide to birds. By chance he met Guy Mountfort, founder of the World Wildlife Fund, who had exactly the same idea about publishing such a book. Over lunch they discussed their separate plans, but as Mountfort had already signed up Roger Tory Peterson to illustrate his book, Phil was quickly persuaded to join the team. The result — in 1954 — was the arrival of *A Field Guide to the Birds of Britain and Europe*. It was a ground-breaking work, and has appeared in many languages.

Guy Mountfort organized several major birdwatching expeditions to Europe and the Middle East, and Phil was always invited to join these — to the Coto Doñana in south-west Spain in 1957, Bulgaria in 1960 and Jordan in 1963. They ignited Phil's fascination for travel. He had already visited the Coto in 1938. He visited Syria, Turkey, Iran, Tunisia and Morocco, often heading out from one place having nowhere to stay the next night. The trips resulted in him co-authoring yet another book — *Birds of the Middle East and North Africa* in 1988.

His last contribution to ornithological literature was in the 1970s and 1980s when Max Nicholson brought together a team to create *Birds of the Western Palearctic*. The nine volumes appeared between 1977 and 1994 and Phil helped with writing and checking much of the text.

Phil Hollom was a modest man who shunned the limelight, and always seemed to be slightly surprised by the popularity of the books that he wrote. In creating the 'Popular' Handbook in 1952, and co-authoring *A Field Guide to the Birds of Britain and Europe* (universally known to birdwatchers as 'Peterson, Mountfort and Hollom') he made birds more accessible to everyone. His contribution to ornithology was recognized by the RSPB, BTO and BOU — all of which awarded him medals for his achievements.

KEITH BETTON

Obituary



JOHN LEONARD CLOUDSLEY-THOMPSON, MA, D.SC., HON. FLS, 1921-2013

John Cloudsley-Thompson joined the London Natural History Society in 1950 and he soon immersed himself in our activities. His father, Dr A. G. G. Thompson (obituary, *LN* 63, 1984), was an active and popular member and contributed to the Society's ornithological activities, notably at Beddington Sewage Farm and Bookham Common. John served on Council and the Entomology Committee from 1955 to 1960, and in 1960 he was chairman of Entomology. During that time he also lectured to the Society and was a valued participant in our Entomology informal meetings.

John Cloudsley-Thompson was born on 23 May 1921 in Murree, north-west India (now Pakistan) where his father, with the rank of major, was Deputy Assistant Director of Medical Services for two years. John was educated at Marlborough and Cambridge where his studies were interrupted by the Second World War. At the age of twenty-one, and after being commissioned at Sandhurst into the 7th Armoured Division, he went to Egypt where he took part in the Libyan Campaign as a tank commander. Between bouts of activity he eased the tension by diverting his crews to collect camel spiders (*Solifugae*) and scorpions, and it was here that he developed his lifelong passion for desert wildlife. It was also whilst he was in North Africa that he tamed a desert fox which he had bartered for half a piastre and a bunch of bananas. One day the fox strayed into the engine compartment of their tank 'and the whole squadron was held up until she had been extricated'. This was the start of his fascination with desert creatures.

However, in June 1942 his tank was knocked out and all the crew were either killed or seriously injured, but John escaped with a badly damaged leg, and following being hospitalized in Egypt, then in South Africa, he returned to England. After recuperating he went back to Sandhurst as a gunnery

instructor, eventually persuading the medical board to allow him to rejoin his regiment. He took part in the D-Day landings in June 1944 and was lucky to escape with his crew when his tank was destroyed at Villers-Bocage. Once into another tank, they took part in the Caen Offensive, a drawn-out and bloody battle. In November 1944, with peace in Europe on the horizon, John, with the rank of captain, resigned his commission and returned to the UK.

There followed academia, Pembroke College, MA, Ph.D. and a lectureship in zoology at King's College, London, as well as an award of D.Sc. by the University of London, and it was during this period that he was active in the LNHS. But in 1960 he was appointed Professor of Zoology at Khartoum University, Sudan, where with his wife Anne, whom he had married after the war (and combined their surnames), he stayed until 1971. This period enabled him to enlarge upon his restricted wartime experiences where he was in his element in the deserts. He would set off in a Land-Rover with Anne, family, and any visitors, on intrepid research trips into the desert, as far afield as Jebel Marra, an extinct volcano in Darfur. At that time, the only tarmac roads in the Sudan were in the towns, so travel was a challenge. John loved all things Sudanese and collected silver bowls, knives, sculptures and cloths which later filled his home in Britain. They enjoyed a full social life in Khartoum, and during that period Anne set up a physiotherapy department at Omdurman Hospital. Then in 1971 the family returned to the UK where John was appointed Professor (subsequently Emeritus) of Zoology at Birkbeck from 1972 until his retirement in 1986.

During the course of his career John wrote over fifty books, both academic and popular, as well as many scientific papers — he was a prodigious writer, still writing until ill-health curtailed him. His special subjects throughout were particularly in the desert environment, especially the ability of wildlife like spiders and scorpions to adapt to the extreme effects of water and temperature, and circadian (diurnal) rhythms.

John held senior posts in numerous natural history organizations, including the British Naturalists' Association (chairman 1974–1983), and in 1993 he was the recipient of the Association's highest honour for outstanding services to the understanding of natural history, the Peter Scott Memorial Award. To mark his ninetieth birthday in 2011, the BNA presented John with a special Fellowship *Honoris Causa* certificate 'in recognition of his outstanding lifetime contribution to the understanding of Natural History'. John was president of the British Arachnological Society from 1982 to 1985. He died on 4 October 2013.

With John's passing we have lost a natural historian of the old school; a pioneering desert naturalist. Anne died in 2012; they are survived by their three sons.

KEITH H. HYATT

Obituary



Wimbledon Common, c.1952.



Rotherfield, East Sussex, March 1991.

ALFRED WILLIAM ('WILBERFORCE') JONES, 1929 – 2014

Wilberforce Jones joined the London Natural History Society in 1951 and soon became involved in our Survey of Bookham Common and City Bombed Sites Survey. He sat on Council from 1955 to 1957 and was secretary of the Ecology Section from 1955 to 1959.

We are extremely grateful to Wilberforce's son Richard for providing this tribute to his father.

My father was born on 19 September 1929, at 1 Elliott Road, Chiswick. We don't know much about his early life, but it was very simple, and sometimes tough. His grandfather was a Yorkshire coal miner, his mother Henriette Lucy Luxton was in domestic service until she married Reginald Bernard Jones, a blacksmith, who fallen on hard times during the slump, had taken whatever odd jobs came his way. In 1934 Bernard was the caretaker on a houseboat on the Thames opposite Hampton Court Palace. It was here, aged just four and a half that my father raised the alarm when Bernard fell overboard: 'Daddy's in the water', he remembered saying.

Alfred's sister Sylvia was born two days later, on the day of the funeral. It's difficult to imagine, now, what life must have been like for a single mother bringing up two young children on the eve of the Second World War. They moved about a lot, often living together, the three of them, in a single room.

This was a time of hardship and difficulty, but I know Dad looked back fondly on his early life, a latch-key kid from the age of six, it certainly made him very independent, single-minded; stubborn we called it.

With no one to guide or influence him, I don't think Dad really knew why he picked up an interest in natural history. He remembered an aquarium tank with dragonfly nymphs at his primary school, and was aware of caterpillars and moth chrysalides in the hedges of west London, especially when he was on his paper round.

In 1944, aged fifteen, he won a scholarship to St Marylebone Grammar School, but the meagre family finances meant he could only stay for two years. He left school at sixteen to join a firm of accountants and studied for his accountancy exams in the evenings. His interest in natural history (entomology, conchology and especially botany) now blossomed and he spent the weekends exploring places like Wimbledon Common and Box Hill and seemingly all his lunch hours scrambling over the derelict City of London bombed sites, examining the wildlife that had sprouted up from the rubble, before they were eventually redeveloped.

It was during this formative time, in about 1950, that he wrote to dipterist Leonard Parmenter, who introduced him to the LNHS, and the Society's Bookham Common Survey. He soon became a regular member of the survey team and published various papers in *The London Naturalist*, notably the flora of the Common, in 1954. Cyril Castell, Bunny Teagle, Ron Payne and George Lawrence were close associates and long-time family friends. He succeeded Castell as secretary of the Ecology Section of the LNHS.

It was at this time that my father acquired his whimsical pseudonym. Visiting the Balham home of fellow naturalist George Lawrence, my father took George's son, Antony, onto his lap. Fascinated by my father's chunky gold signet ring, engraved with his initials — AWJ — the toddler asked what the 'W' stood for? Quick as a flash, before my father could answer, Mrs Lawrence interjected 'Wilberforce!' The name stuck and many people knew him only by this name.

In 1957 he married Rosamond Stevens, and with the arrival of children from 1958 he spent less time in the Society's social machinery. A move to Newhaven, in Sussex in 1965 (following the relocation of the firm of accountants to Lewes) effectively ended his close association with London and the LNHS, but he remained a member to the end.

For the next fifty years he concentrated his energies on the plants (and some insects) of Sussex, and between 1 March and 30 September spent most weekends (and virtually every weekday too since he retired) marching across the county, noting and recording, and writing up many local floras of the individual survey areas he selected, until they had more or less coalesced into a flora of the entire county. In the 1970s he made many return visits to Bookham to resurvey the plants, and in the new millennium he returned again, and also to Wimbledon Common, Ranmore Common, White Downs and several other Surrey localities of his youth. His last contribution to the LNHS was a commentary on Bookham and Wimbledon bomb craters, in the 2008 *London's changing natural history* volume.

Wimbledon Common was an especially poignant place for my father. He was later to recall one of his earliest memories, aged not quite four, in the summer of 1933. His mother and father had taken him there and got lost in the woods, but late in the day found their way back to Queensmere. His footsore mother

adamantly refused to go another step and sent his father home by bus to Shepherd's Bush for some blankets. They slept that night under a tree whose branches came right down to the ground. Life was simpler and safer in those days.

Although he was always convivial and affable, he was also an intensely private person; he was self-deprecating and modest in the extreme. Apart from his earliest Surrey recording, he never published any of his botanical surveys, but he leaves a truly vast manuscript archive of several hundred neatly handwritten notebooks and survey write-ups to the Botany Library of the Natural History Museum. Most of these are for parts of Sussex, Hampshire and Dorset, but also included are his five large volumes on the flora of the East Surrey Hills, his more recent resurveyed floras of Bookham, Ranmore and Wimbledon Commons, Holmwood and other Surrey localities within the LNHS recording area. His insect collections (ten cabinets with associated catalogues), herbarium specimens and snail shell collections have gone to the Booth Museum of Natural History, in Brighton.

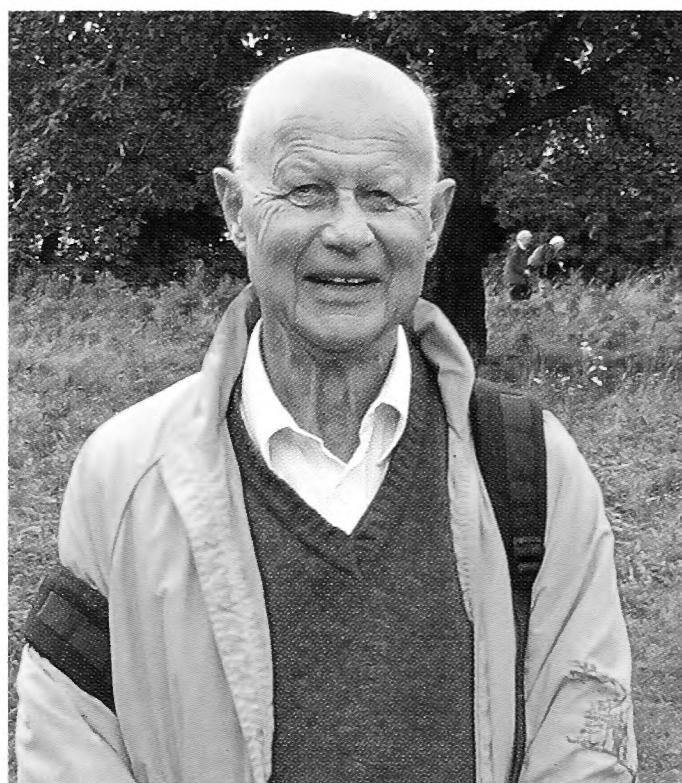
A field naturalist to the core, he was active to the very last, and on 23 May 2014, the day before he died, he'd been out walking and botanizing, as normal, through the woods and fields of the Sussex Weald by Cuckfield, near Haywards Heath.

RICHARD A. JONES

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Obituary



HOWARD LLOYD DAVIES, 1931–2013

Members of the Society's Botany Committee in particular will be saddened to learn of the death of Howard Davies. Joining the London Natural History Society in 1976, he soon became an active member of the Botany Committee. Between 1980 and 1984 he was our Indoor Meetings Secretary and in due course became our longest-standing Committee member.

Howard was born in Wallington in Surrey where he lived for most of his life. He attended Sutton County Grammar School, and went up to Fitzwilliam College, Cambridge where he read Natural Sciences (BA in 1952). This gave him a thorough grounding in botany. Following two years' National Service (1953–1955), he found employment as an industrial chemist with the Dunlop Rubber Company in Birmingham. However, this soon ceased to interest him and he entered Birmingham University to retrain and take a degree in mathematics (B.Sc. in 1959). On graduation, he returned to Wallington and started work at University College London in the Mathematics Department. He was to lecture here for the rest of his working life.

In addition to the LNHS, Howard belonged to many other organizations with concerns for the environment. They included Surrey Wildlife Trust, Ecology and Conservation Studies Society, Nonsuch Watch, Sutton Nature Conservation Volunteers, Plant Life, British Pteridological Society, Friends of Kew, Woodland Trust, RSPB and the Geologists' Association. But he was most closely associated with the South London Botanical Institute, which he joined in 1978, later serving on its Council and becoming a trustee in 1987. Dr June Chatfield writes of his remarkable enthusiasm for seeking out and identifying plants. She remembers him, on one of SLBI's field outings: 'still being up beyond midnight identifying grasses and the more tricky plant species. His mathematical background was evident in his precision work, very careful examination of detail in plants, drawing on his Natural Science training and avidly recording everything in neat small handwriting.' Petra Broddle, also a member of SLBI, remembers that he collected seed from the Institute's

specimen of the rare Lundy cabbage. When this plant died, Howard was able to replace it with one that he had grown from its seed. Howard's collection of pressed plant material, assembled over a period of more than forty years, is being collated by SLBI and will make a valuable addition to the Institute's herbarium. Many of his books have also found a suitable home in the Institute's Library.

Howard joined many LNHS botany field outings, invariably arriving on his bicycle, which accompanied him everywhere. He was an enthusiastic member of Cyclism, a group of Sutton cyclists, leading regular summer rides for them over many years. He disapproved of motorcars, referring to them as 'polluting machines', and encouraged the Botany Committee to ensure that all our field outings should start at venues that were accessible by public transport. This we still endeavour to do, but we will greatly miss Howard and his trusty bicycle.

I am grateful to Shirley Quemby (one of his executors from Cyclism) for biographical details, and to Dr June Chatfield and Petra Broddle from SLBI for reminiscences.

DAVID BEVAN

Veteran oak by the Round Pond and Jew's ear <i>Auricularia auricula-judae</i> at Nonsuch Park, Ewell	Frontispiece
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